FIRST LESSONS IN GEOGRAPHY

KNOWLTON

THE MACMILLAN COMPANY

Quentin. Smith
Castalia. Ohio

Quentin

Quentin

Quentin Smith

FIRST LESSONS IN GEOGRAPHY

The earth

FIRST LESSONS IN GEOGRAPHY

BY

PHILIP A. KNOWLTON

COPYRIGHT, 1924,
BY
THE MACMILLAN COMPANY
All rights reserved

REPRINT OF 1925

PRINTED IN THE UNITED STATES OF AMERICA

PREFACE

The author has sought to provide a textbook in geography so simple that it can be read with understanding by all children who have mastered the mechanics of primary reading. Such a book, which in many schools will be the first informational textbook in any subject, must conform to the reading ability of its users. It must be simple in thought, vocabulary, and sentence structure. As to vocabulary, this book has been tested by Thorndike's *Teacher's Word Book* and found suitable for its purpose. In thought and sentence structure, simplicity is more easily claimed than proved. Extreme simplicity in these respects also has at least been attempted.

Beginners' texts in geography have hitherto been of three kinds: primers, so to speak, of industrial geography; introductions to physical geography; and simple travel readers. The present text partakes of the nature of all three. The point of departure is, throughout, the child's environment. Only the most significant features of this environment receive attention, but the aim has been to interpret these in such a way that the child

(1) understands fundamental facts, processes, and relations so simple that a knowledge of them is too often presupposed;
(2) appreciates the mutual dependence of nations and of occupations;
(3) gains familiarity with the simplest essentials of locative and descriptive geography;
(4) learns to study pictures and maps — the latter even before he knows that they *are* maps.

As one of the social studies, geography is intimately related to history and civics. In this text, the author has not hesitated to lead the pupil into these two fields when, by doing so, he could give them a clearer understanding of matters geographic.

Grateful acknowledgments are made to Frank M. McMurry for reading the manuscript, and for encouragement throughout the preparation of the book; to Vilhjalmur Stefansson for criticism of all passages relating to the Eskimo; and to Frederick G. Bonser for reading the proofs and for many helpful suggestions.

P. A. K.

INTRODUCTORY NOTE

Geography more than many other studies depends upon the imagination of children for appreciation of its facts. For instance, it demands that they visualize the Rhine River with its castles, Paris with its magnificent streets and palaces, the Ruhr region with its smoke stacks, the cotton belt in the South, the corn belt in the North, and the grand scenery in our National parks.

But the imagination cannot create outright. It can only reassemble items out of what has been experienced, or build up pictures of distant situations and conditions out of such related elements as are already well known. A child can visualize the above things only to the extent that he has become acquainted with rivers, streets, palaces, manufacturing regions, farms, and fine views. Success in geography rests entirely upon this foundation of past experiences.

Textbooks in geography have never sufficiently provided for this foundation. They have not to any great extent recalled and refined first-hand experiences of children, and carefully put these together so as to arrive at others. They have always presupposed this foundation, rather than supplied it.

This book deals with the problem of preparing a basis for later geography. It was partly because Jane Andrews' *Seven Little Sisters* dealt with this question that it was so popular for so many years. This book attempts the solution in a very different way; but the ideas presented are so vital, and the method of treatment is so simple, that this different way may prove even more effective.

FRANK M. MCMURRY,
Teachers College,
Columbia University.

CONTENTS

		PAGE
	PREFACE	iv
	INTRODUCTORY NOTE BY FRANK M. MCMURRY	v
CHAPTER		
1.	WHAT EVERYBODY NEEDS	1
2.	HOW WE GET OUR FOOD	6
3.	HOW WE HAVE LEARNED TO GROW GRAINS. WHEAT	14
4.	HOW WE USE WHEAT	23
5.	OTHER GRAINS AND THEIR USES	31
6.	HOW WE GET OUR MEAT	39
7.	HOW WE GET OUR MILK, BUTTER, AND CHEESE	50
8.	HOW WE GET FOOD FROM THE SEA	60
9.	HOW WE GET OUR VEGETABLES AND FRUITS	68
10.	HOW WE SWEETEN AND SEASON OUR FOOD	77
11.	HOW WATER GIVES US FOOD AND DRINK	86
12.	WHAT WE WEAR	95
13.	HOW WE MAKE CLOTH OUT OF PLANTS	103
14.	HOW WE USE ANIMALS FOR CLOTHING	112
15.	HOW OUR CLOTHING IS MADE	121
16.	DIFFERENT KINDS OF HOUSES	128
17.	OUR FORESTS AND THEIR USES	138
18.	STONE THAT WE QUARRY AND STONE THAT WE MAKE	149
19.	HOW WE FURNISH OUR HOUSES	161
20.	HOW WE GET OUR FUEL	169
21.	HOW MAN MAKES NATURE WORK FOR HIM	179
22.	FROM STONE TO STEEL	189
23.	HOW PEOPLE AND GOODS ARE MOVED. I. ON LAND	198
24.	HOW PEOPLE AND GOODS ARE MOVED. II. ON LAND AND THROUGH THE AIR	209
25.	HOW PEOPLE AND GOODS ARE MOVED. III. ON THE WATER	219
26.	HOW GOODS ARE BOUGHT AND SOLD	230
27.	HOW PEOPLE EXCHANGE MESSAGES	240
	INDEX	251

1. WHAT EVERYBODY NEEDS

First Do These Things

1. Think of ten things you would like most to have. Find out how to spell their names, and write a list of them.

2. Be ready to tell your teacher and your classmates *why* you would like each of these things.

3. When you have made the list of things you would like to have, try to decide which things on this list you really *need* and which you do not.

4. Think of things you *need*, to take the place of each thing on the first list that you would like to have but do not need. Find out how to spell their names, and write them down.

5. Be ready to tell your teacher and your classmates *why* you need each of these things.

6. Ask your teacher to read or tell you the story of King Midas and the Golden Touch.

Then Read This

Perhaps you have never thought how fortunate you are to live in a country where almost everybody has enough to eat and drink. There are other countries, far, far away, where men and women and boys and

girls are hungry much of the time. There are even places where water is so scarce that people are often thirsty, too. But not many American children have to wonder how they are going to get their next meal.

Boys and girls who always have enough to eat are likely to be more interested in bicycles and footballs and dolls than they are in bread and milk and meat. But if trains and ships should stop running even for a few days, our supply of food would soon be gone. Boys would then gladly trade their footballs for loaves of bread; girls would give up their dolls for bottles of milk. For we can get along without playthings if we have to, but we cannot get along without food. *Food is a necessity.* Things that we cannot do without are called *necessities.*

On a hot summer day you are more interested in going in swimming than you are in a new dress or a new suit of clothes. But in the winter you would quickly freeze if you did not have warm clothing to wear to school and at play. On a cold winter day you would gladly give up every toy you have for a comfortable overcoat. For you cannot get along without clothing. *Clothing*, then, *is another necessity.*

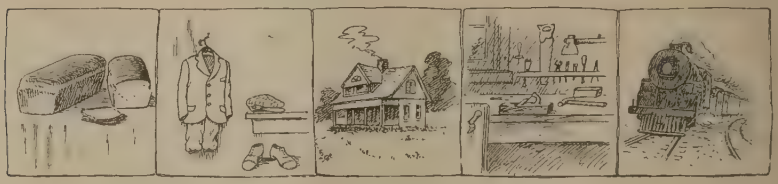
Suppose you had plenty of food and plenty of clothing, but not even a tent to live in. The first rainstorm would rust your bicycle and spoil your doll. You would gladly give up these things for a place to sleep in. We may enjoy ourselves out of doors for a few

hours at a time, but we cannot live happily without a home. *Shelter*, then, *is a third necessity.*

Food, clothing, and shelter are our three great needs or necessities. But we cannot have food unless farmers and butchers and fishermen have tools with which to do their work. We cannot have houses unless the carpenters who build them have saws and hammers. We cannot have clothing without machinery for making cloth. *Tools, or implements*, with which to work *are*, therefore, *still another necessity.*

I know a farmer's boy who milks several cows every day and raises his own vegetables. He would have enough to eat if the railroad trains stopped running; but if he wore out his clothes he would not know how to make new ones. I know a city girl who makes her own dresses out of cloth that is made in the factory where her father works. If the trains stopped run-

ning, she would have plenty to wear but nothing to eat. The farmer's boy cannot live happily unless things that are made in cities can be brought to his farm. And the little city girl cannot live at all unless food is brought to her from some far-away farm. Very few things are used where they are made. So every useful thing in the world must be carried or hauled from the place where it is made to the place where it is used. *Carrying or hauling people or things*, then, from one place to another *is a fifth great necessity.*



NOW ANSWER THESE QUESTIONS

1. What are the five necessities that you have just read about?

2. What are the kinds of food and drink that you like best? Are these the ones that you need most?

3. In what season of the year is clothing most necessary? Is food more necessary at one time of year than at another?

4. Clothing and shelter are both necessary because they keep us warm and dry. We also wear clothes because they look pretty and are "in style." Are there other reasons why shelter is necessary?

5. What tools, or *implements*, do you have in your home and how are they used?

6. Freight trains carry many things, or articles, from the places where they are made to the places where they are used. What else do you know of that carries freight for long distances?

7. Tell, if you can, why King Midas was like a boy or girl who thinks too much of playthings and does not know the value of food, clothing, and shelter.

2. HOW WE GET OUR FOOD

First Do These Things

1. Copy the names of the animals in the following table. Find out, if you can, what each animal eats. Write the names of its chief foods after the name of each animal, thus:

Horses	hay, oats
Cows	
Pigs	
Sheep	
Dogs	
Cats	
Chickens	

2. Make a list of plants that are eaten by any of these animals. Make a list of animals that eat the flesh of other animals.

3. Make a list of plants that you have eaten. Make another list of animals whose flesh you have eaten.

4. What do we drink that comes from animals? What do we drink that comes from plants? What do we drink that comes from neither plants nor animals?

Big trees like these are really plants. Tell, if you can, how such trees are useful to us.

5. Get your father to show you the Great Dipper and the North Star. Far away under the North Star is the country of the Eskimos.

THEN READ THIS

All living things are either plants or animals.

Plants remain in one place. They eat and drink and grow, but they do not feel or think as we do. Some plants are very small, and some are very large. A little blade of grass is a plant; so is a big tree. Both take food from the soil and the air and the sunshine, and both drink water when it rains. But neither can move about, and neither feels pain when it is cut down.

The man is climbing the tree to get the coconuts at the top.

Animals, too, eat and drink and grow. They can also see and hear and move from place to place. Animals eat plants or other animals. Some animals, like the cow, eat only plants. Other animals, like the lion, eat chiefly weaker animals. We eat both plants and animals. But all our food is either plants or plant food which is stored up in the flesh of animals that have eaten plants.

Some people eat much plant food and very little animal food. Have you ever eaten the meat of the coconut? Coconuts grow on tall, slender palm trees, in countries where the weather is always warm and where there is no snow at any time of the year. Inside the hard shell of the coconut is the firm, white meat. 'Way in the center is the white milk that you hear go "Slosh, slosh" when you shake the coconut. In hot countries where the coconut palm grows it is easy to get food. Have you ever seen a lineman climb a telephone pole? The brown men who live in these countries climb coconut palms to get the coconuts in much the same way. When people can get plant food as easily as that, they do not have to kill many animals for food.

Just at noon, turn your back to the sun. You are now looking toward the north. If it were night, you would see the North Star straight ahead of you. Far away in the north there are countries where the winters are very, very long and very cold. In such countries the summers are very short. The grass grows long and green, and there are many brightly colored flowers and low bushes covered with berries. But grass and flowers and bushes can grow where trees and garden vegetables cannot grow. For this reason the people who live in these countries where the winters are long and the summers are short do not have much plant food. They have to eat animals

From "The Friendly Arctic," by Vilhjalmur Stefansson. By permission

These flowers are blooming in the far North, where the summers are very short

instead. Big four-footed animals like the caribou and the reindeer eat the grass and the bushes. Many fish live in the streams and in the shallow ocean water. Big animals like the seal and the polar bear eat the little fish. What do you suppose the *people* eat? They eat the caribou and the reindeer and the fish and the seals and the polar bears! These people are called *Eskimos*. I know of a family of Eskimo children who have never heard of oatmeal or milk

or potatoes. But they like to eat meat and the fat of seals, and they think raw, unsalted fish a great treat.

In our own country we have to get our food in a very different way. We cannot live on coconuts and wild plants because there are not enough wild plants to go 'round. And we cannot kill wild animals for food because there are so many of us that there are not enough wild animals to go 'round, either. Now what would you expect people to eat if they could not find enough wild plants or animals? *Tame* plants and animals, of course! And that is just what we *do* eat. Most of the people in the world live in countries where there are so few wild animals and wild food plants that they would quickly starve unless they made tame plants and animals grow. Raising tame food plants and animals is called *farming*. This is the most important occupation in the world.

But we cannot eat *all* plants. Trees are plants, yet if you were lost in a forest you might soon starve to death; and surely you could not eat grass as horses and cows do. So we must raise plants that we have learned to eat. You have already made a list of these. (Exercise 3, page 6.) And we should not want to eat *all* animals. You and I would object to eating snakes or rats or kittens. So we must raise animals that give us milk, like the

cow; or eggs, like the hen; or flesh that we can cook and eat with enjoyment. You have already made a list of animals whose flesh you have eaten. (Exercise 3, page 6.)

Now Answer These Questions

1. Here are the names of some foods. Put those that come from plants in one list. Put those that come from animals in another. Put those that come partly from plants and partly from animals, in a third list. If you do not know what any one of these foods is made of, ask your mother or your teacher. — Roast beef; apple sauce; bread; butter; cake; bacon; mutton; cookies; pumpkin pie; ice cream.

2. What are the chief ways in which plants are different from animals?

3. What wild animal food have you ever eaten?

4. Why do the Eskimos eat chiefly animal food?

5. Make a list of five plants that you cannot eat. Of five animals that you cannot eat.

6. Why do we eat chiefly tame plants and tame animals?

7. What name is given to the most important occupation in the world?

8. What is meant by *north?*

Photo from Brown Bros.

Raising tame animals and plants is called farming.

3. HOW WE HAVE LEARNED TO GROW GRAINS. WHEAT

First Do These Things

1. Tell what plant foods you have seen growing wild. Are any of them also grown by farmers or gardeners?

2. What plant food that animals eat do you very often see growing wild?

3. Long, long ago, when the world was much younger than it is now, people made many very important discoveries. In this chapter you will read about two of these discoveries. Try to guess how a round log on a hillside may have helped men to invent the first wagon. Try to guess how a floating log may have helped men to invent the first boat. What lessons about cooking do you suppose men may have learned from forest fires?

4. If you live where wheat is grown, get a few kernels and bring them to class. If you cannot get them in any other way, your teacher will help you to write a letter to a class of your grade in North Dakota asking the pupils to send you a few kernels. Perhaps they will ask you for something in return Save these kernels. You will need them later.

Then Read This

Most plants that men now grow for food once grew wild. A very long time ago, long before the olden times told about in your story books, people learned that the seeds of several kinds of tall grass-like plants were good to eat. Perhaps the women and children were hungry and gnawed them when the men went hunting and never came back. Anyhow, people learned that they could live on these seeds, and not be hungry when other food was scarce. One kind of seed that was found to be good to eat was the seed, or the *kernel*, of wheat. Another kind was the seed of barley. We call these seeds *grains*.

This was a very important discovery. But after a long, long time an even greater discovery was made. Can you guess what it was? People learned that they did not have to hunt for new fields whenever they wished to get grain. They discovered that they could make grain grow. Just how they happened to learn this, we do not know. Perhaps they dropped some kernels by accident on a spot where the sod had been turned up and the ground was bare, and trod them into the soil. And you know what happens when seeds are buried, do you not?

For many hundreds of years women and children gathered the stalks of wheat, a few at a time, when they were ripe, while the men hunted and fought. They pounded the hard kernels between stones and

made a heavy, coarse paste out of the pulp. At first they ate this raw. Then they learned to bake it on hot stones.

After a long time men learned to loosen the ground with a hoe when they were ready to plant grain. Then they invented the *plow*. This was drawn by strong animals which they had tamed. For thousands of years plows were made of wood. In fact, in some old-fashioned parts of the world wooden plows are still used. And for thousands of years grain was cut slowly by hand with a sickle or scythe.

Our own country is only about five times as old as an old man. For a country, that is very young indeed. But our country has grown very fast. In the old countries of the world there are so many people that each farmer has only a little land and can grow only a little grain. When the farmers in the old countries learned that they could have much more land in our big new country, a great many of them brought their families across the wide ocean and came here to live. Many farmers had so much land that they could not use it all for growing grain unless they had better tools. So better tools were soon invented.

Erik Nielson is eight years old and his sister Hilda is nine. They live in the north of our country where the winters are cold and windy and

the summers are very warm. On every side they can see a long way, for there are no hills or trees to shut out the view. Their father is one of the men who crossed the wide ocean to get more land. He and all his neighbors grow wheat. One day he

Photo from Brown Bros.

A gang plow drawn by a tractor

and Erik and Hilda walked all the way around the farm. They followed the fence, and it took nearly two hours to make the trip.

Mr. Nielson has the best farming tools, or implements, that money can buy. Every one of them was invented in our own country. He could not grow wheat on so much land if he did not have

them. In the spring Erik and Hilda like to watch their father and the hired men plough the broad, level fields. They loosen the soil with a *gang plow*. This has several great steel blades, or *shares*, side by side, and each share turns over a long, smooth *furrow* of the earth, as the plow goes round and round the big field. Mr. Nielson's gang plow is drawn by a funny-looking engine with wide, rough wheels. He calls it a *tractor*. His nearest neighbor does not have a tractor, but hitches sixteen horses to his gang plow.

After the ground is plowed, Mr. Nielson *harrows* it with what he calls a *disc harrow*. This has round steel knives that are drawn across the field like sharp

Photo from Brown Bros.

A disk harrow drawn by a tractor

Photo from Brown Bros.

Planting grain with drills

little wheels. These wheels cut the furrows into small pieces. Then comes the *smoothing harrow;* next, the wonderful *drills* that drop the seeds down into the earth at just the right depth and the right distance apart.

Then, when the summer comes and school is out and the crickets sing in the long, sunny evenings, Hilda and Erik like to look at the great fields of growing wheat. Early in the summer the young shoots are tender and green. Later in the summer they are golden yellow and waist-high, and Hilda and Erik watch the waving stalks as they bend before the little breezes that flit across the fields.

Thresh
The straw goes out of

Still later in the summer comes the *harvest.* The wheat plants are now full grown, and from each little kernel has sprung a tall stalk with many new little kernels on it. Mr. Nielson must now gather these kernels so that he can sell them for money with which to buy clothing and tools and food and other things. It would take too long to pick the kernels from their stalks. So he does what is much easier — he cuts down the stalks and brings them all together to a machine that picks out the kernels for him.

First he drives a *binder* over the field of full-grown grain. This machine is even more wonderful than human hands, for it cuts the stalks, rakes them into bundles, ties, or *binds*, the bundles, and leaves the

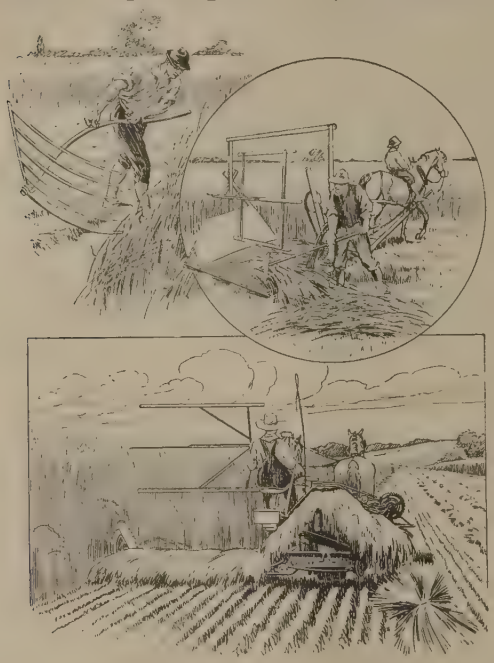
ing
the spout at the left.

bundles in neat rows on the fields! Then he hauls the bundles to the big, snorting machine called the *thresher*. This machine, with a lot of noise and dust, drops the kernels safely into bags and blows the *straw* (for that is what they call the dry stalks) out of a long tube into a big pile.

In very olden times people used to spread grain out on hard earthen floors and beat it with rods called *flails* or have cattle tramp on it. This was called *threshing* the grain. The threshing broke the chaff, or outer covering of the kernels, away from the grains. Then the chaff was blown away by big fans. Farmers have learned a great deal since those days. We may well be proud of the men who invented these machines that do the work of many people.

NOW ANSWER THESE QUESTIONS

1. What great discovery, long ago, gave people the idea of getting food by farming?



This picture shows you how the machinery that farmers use to cut grain has become better and better. At the top is a scythe and "cradle"; in the middle, an old-fashioned reaper; below, a binder.

2. What does *grain* mean? What does *kernel* mean? *Flail? Chaff?*

3. How have animals helped men to grow grain for food? You will soon learn, also, that some grains have helped men to raise animals for food.

4. What is meant by *harrowing* a freshly plowed field?

5. What are the two busiest seasons on the farm where Erik and Hilda live? Why?

6. What two kinds of farming implements have men had for thousands of years? Make a list of wonderful farming implements on Mr. Nielson's farm that have been invented by Americans. Tell what each does.

4. HOW WE USE WHEAT

First Do These Things

1. Let one pupil bring to class two smooth, round stones about as large as stove lids. Put a few kernels of wheat on one of these stones. Put the other stone on top, press down on it, and turn it round and round. What happens to the kernels?

2. Let each pupil read the label on the box in which his favorite breakfast food comes. If it is made of wheat, bring a small sample to class in an envelope. Tell the class all you can about it. Save all the samples you bring to class. You will need them later.

3. Let one pupil bring a small sample of white flour. Let another bring whole-wheat flour, another, a small slice of white bread; another, a small slice of whole-wheat bread.

Then Read This

In the last chapter you read how the farmers of to-day can grow a great deal more wheat than the farmers of olden times. The reason for this, you remember, is the wonderful farm machinery that the men of our country have invented. You also learned that long, long ago men did not know how

to grind the wheat kernels very fast or very well. But ever since those early days people have been searching for new ways to save themselves work. When people learn to make a machine that does the work that ten or fifty men used to do before, they have time to think and read and write books and enjoy beautiful things. We say that they become more *civilized*. One of the most necessary tasks that men have made machinery do for them is the grinding of grain.

Far across the ocean in the direction of the sunrise, which we call the *east*, is a dry, warm land called Palestine or the Holy Land. Two thousand years ago — just think of it, as many years ago as you were days old when you began to come to school — it was not quite so dry as it is now. Countries change very, very slowly, you see, and get warmer or colder or higher or lower or wetter or drier than they were before. Well, when Palestine was not quite so dry as it is now, the Bible tells us that the men who lived there grew a great deal of grain. And how do you suppose they ground it? In almost the same way that you ground the kernels of wheat in class, but with bigger stones! There was a hole in the top stone and the kernels were poured into this. There were grooves in the bottom stone where the finely ground grain was gathered. This ground grain we should call *flour*. Anything that grinds

© Brown Bros.

Grinding wheat with stones

grain is called a *mill.* In olden times some people used millstones that were not too heavy for men to turn, and they often made their slaves turn them. In other countries the stones were so heavy that the upper stone had to be turned by a donkey.

Many hundreds of years later, in the early days of our own country, farmers took their grain to *grist mills* to be ground into flour. A man called a

miller built a mill beside a stream. Then he built a stone or wooden dam across the stream. When the water behind the dam got as high as the dam itself, it fell over the dam and formed a little home-made waterfall. The miller made this waterfall hit

© Brown Bros.

A grist mill, with dam and water wheel

buckets or blades on the rim of a water wheel in such a way as to turn it. Then he made the water wheel turn the mill, much as slaves or donkeys had done long before.

There are now so many people in our country that the old-fashioned grist mills could not grind enough flour for them. When people need more of anything than they can make with simple machinery, they soon invent machinery that is not so simple.

Such machinery often works both better and faster than simple machinery. The machinery in the flour mills nowadays is very complicated indeed. Grain is sent in bags to big cities like Minneapolis and Buffalo. There it is stored in tall buildings called *elevators* until it is needed in the mill. The first

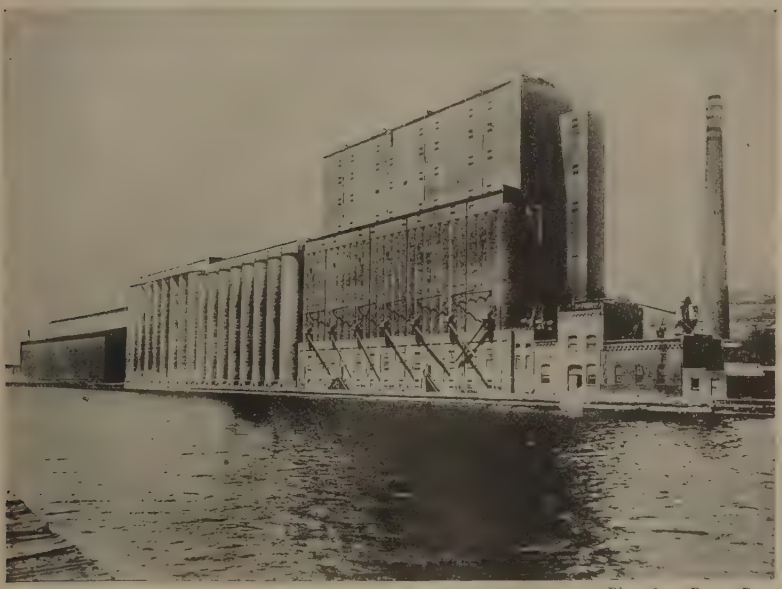
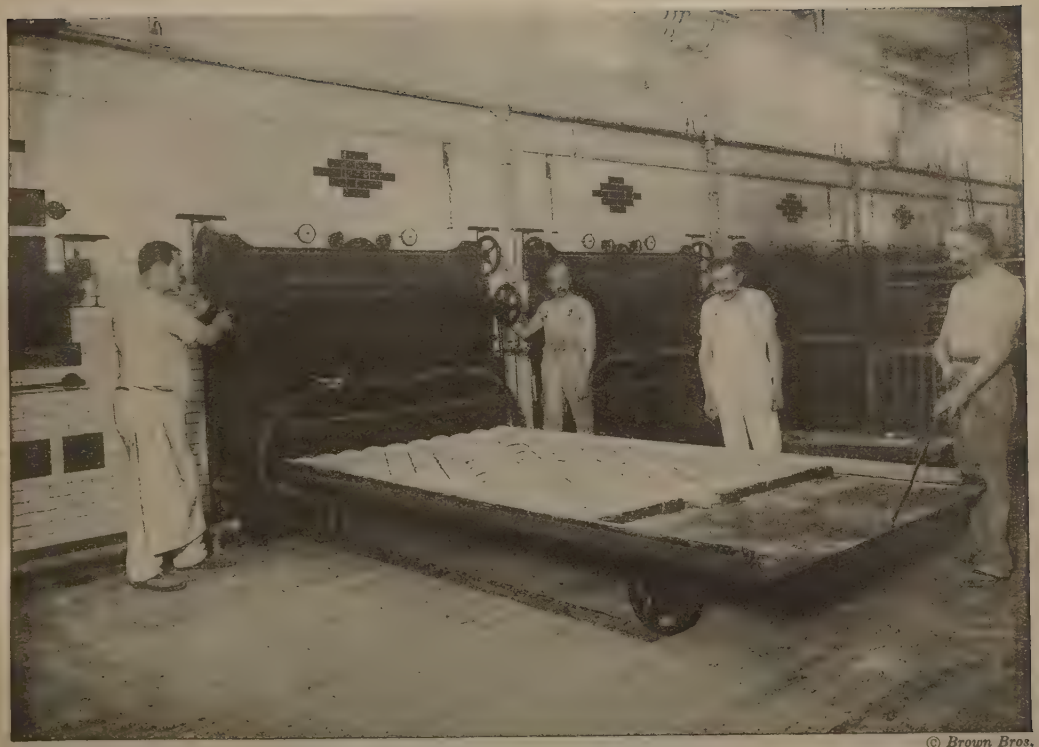


Photo from Brown Bros.

The largest grain elevator in the world

machines scour the kernels until they shine. Then the kernels pass many times between heavy steel rollers. The pieces of wheat kernel get smaller and smaller, until at last they are a very fine, powdery flour.

In the old days people thought that the thin, scaly covering of the wheat kernel had no value as



© Brown Bros.

Putting loaves into a large bakery oven

food. We now know that this thin covering is one of the best parts of the wheat. We call it *bran*. Most millers still make *white* flour, from which the bran has been removed. But others make *whole-wheat* flour; from this a darker bread is made. Whole-wheat bread is better for us than white bread.

When your mother was a little girl, very likely most of the bread that she ate was made by *her* mother — your grandmother. In those days most women bought flour and yeast and made their own bread. Many families in the country and in small towns still make their own bread. But in the large cities most of the bread comes from *bakeries*. In a big bakery there are machines that *knead* or mix the dough, and great ovens that bake hundreds of loaves at a time and never scorch a single loaf! To-day your mother can buy bakery bread almost as cheaply as she can make her own.

Now Answer These Questions

1. What is meant by a *civilized* man?
2. What is meant by *east?*
3. What is *bran?* A *grist mill?* A *grain elevator? Whole-wheat* flour?
4. How does a water wheel work? Perhaps your father will help you to make a little one that will turn when you put it under the kitchen or bathroom faucet, or in a small stream.

5. Did the invention of farm machinery help men more than women? Did the invention of milling machinery help men more than women? Did the invention of baking machinery help men more than women?

6. In this chapter we have learned how flour is made from wheat. What else is made from wheat?

7. Why is wheat a good food to send to countries where many people are hungry and poor?

5. OTHER GRAINS AND THEIR USES

First Do These Things

1. Make a list of the ways in which you have eaten corn. No matter how hard you try to name every use of corn, you will probably fail to think of the commonest of all. You will learn in this chapter what that is.

2. Let each pupil find out whether any breakfast food that he eats is made of corn. If it is, let him bring a small sample to class and tell, if he can, how it is made.

© Brown Bros.

3. Let one pupil bring to class a small sample of hominy; another, a few grains of rice; another, a handful of oats; another, a little puffed rice; another, a handful of popcorn. If any pupil can get a small sample of millet, let him bring it also.

4. Draw or copy a picture of an ear of corn without the husks.

Then Read This

You have learned that Wheat is a very old member of the family of grains. People were well ac-

quainted with him in Bible times, and that was a very long time ago. Wheat and his brothers Barley and Oats and Rice were born far to the east of us, in the Old Country beyond the ocean. Wheat has still other brothers, like Millet, that have made more friends in the Old Country than they have in our new country. Men soon saw that all these grains were members of one family, so they gave them a family name, Corn. In the Old Country, Corn means Wheat or any of his brothers.

Wheat has a very young brother named Maize. Maize was born on our side of the ocean. His first friends were not white people at all, but the red Indians. When the first white men came across the ocean, Maize was a stranger to them, so they called him not by his first name, but by his last name, Corn. But they did not mean the other members of the Corn family. They meant just Maize.

A great deal of corn — for this is the name that we shall always give it — is grown in the middle, or *central*, part of the United States, our country. It takes two whole days and nights to ride in a

fast train from one end of the *corn belt*, or the part of our country where most of our corn is grown, to the other. If we could take all the corn we grow in our country in one year and pile it in bushel baskets and put all the baskets close together in a row, the row of baskets would reach three times as far as to the moon. If you should ride on a fast train on a track beside this row of baskets, it would take you two whole years to reach the end of the row.

Of course you know what an ear of corn looks like. You drew a picture of one yesterday. Most of you have seen corn growing. You remember the long rows of tender green shoots when they first

© *Ewing Galloway*

A field of young corn

came up in the spring. You remember how gracefully the stalks bent over toward the earth when they were half grown. And you remember playing hide-and-seek in the cornfields late in the summer. Perhaps you have pushed apart some of the husks

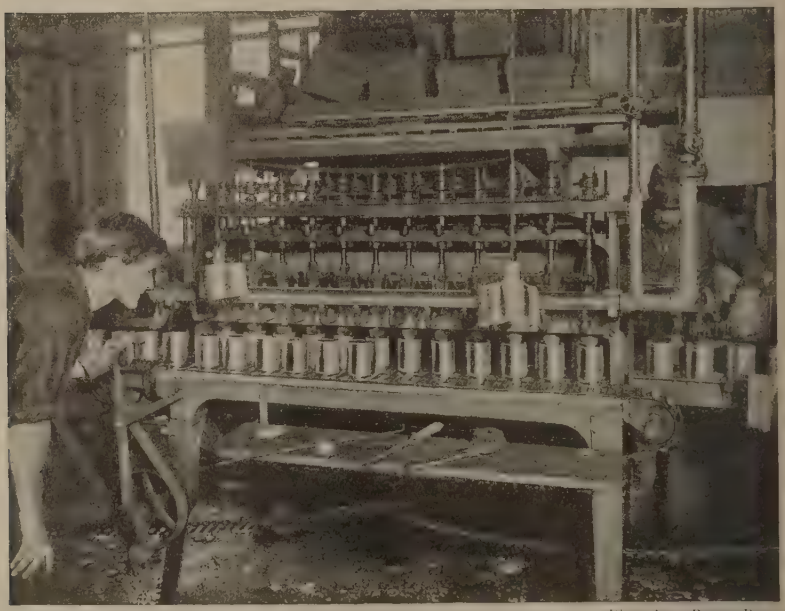


Photo from Brown Bros.

Putting the covers on cans of corn

to see if an ear was filled out, and then picked it to eat with butter and salt, steaming hot on the cob.

The season for fresh corn is very short. It would not pay the farmers of our country to grow corn just to be eaten fresh. So they have invented ways to give us corn to eat the year round. Many farmers

sell green corn to the *canneries*. At a cannery corn is put into tin cans and cooked, and sealed up so tightly that it will remain good to eat until the can is opened. Other farmers sell corn to *factories*, or big work-shops, where men and women make it over into breakfast foods and starch and sirup and many other things.

But most of the corn that we grow is not sweet corn, but *field corn*. This reaches our stomachs in a very roundabout way. Most of the tame animals that we raise for food like corn just as well as we do, and some of them eat stalk and all! So the farmer

Photo from Brown Bros.

Putting corn into a silo
Notice the tractor at the right.

feeds corn to farm animals and uses every bit of what he grows. Cattle are very fond of corn, and hogs that are turned loose in a corn patch make regular pigs of themselves.

Photo from Brown Bros.

A corn crib

Cows and pigs, like ourselves, have to eat the year round. If a farmer could feed only fresh corn to his animals, they would be overfed in August and would starve for the rest of the year. So the farmer cans corn for his cattle too. But a cow is so much bigger than you or I that she eats much more, and needs a much bigger can. For this reason, the farmer cans his cows' corn in a wooden or stone can higher than

his barn. He calls it a *silo*. Have you ever seen one? The farmer also keeps dried ears of corn for his pigs to eat in winter in a shed called a *crib*.

In the next chapter you will learn how the corn that the pig or the cow eats gives us food, too.

We have so many important things to study in this book that we must soon say good-bye to Corn or Maize, and all his brothers. But first we must have a speaking acquaintance with one of his oldest and most important brother grains, Rice. Children in this country have all seen Rice, yet they do not know him as well as they ought to. But the little black-haired, slant-eyed, and yellow-cheeked children in two very old and far-away countries, China and Japan, know him very well indeed. They know him so well that they could not get along without him.

Rice grows only where the summers are very long and there is a great deal of water. In China and Japan there are so many farmers that each farmer has a farm only about as big as a rather small garden. He is really a gardener, not a farmer. The farmers, or gardeners, in those countries grow more rice than anything else, and since there are so very many of them, they grow much more rice than all the other countries of the world. They grow it in little square fields that they keep covered with water most of the time. In the United States we grow rice in better and easier ways, and use machinery like that used

Photo by E. B. Callahan

Growing rice in Japan

in the wheat fields. Some day we may grow as much rice as they grow in China or Japan.

Now Answer These Questions

1. What is the other name of corn?
2. What is meant by the *corn belt* of our country? Where is it?
3. What is the name of our own country?
4. What is a *cannery?* A *factory?* A *silo?* A *crib?*
5. The rice that you have seen is just the kernels of the rice plant. What, then, must be done before the kernels can be used?
6. In what ways have you eaten rice?

6. HOW WE GET OUR MEAT

First Do These Things

1. Tell what animal each of these kinds of meat comes from: pork, mutton, bacon, beef, ham.

2. Ask your father or mother whether the chickens sold by your butcher are "cold-storage" chickens or freshly killed.

3. Find out what kinds of food hogs and chickens like best. Do we eat only animals that eat clean food?

4. On page 6, Exercise 2, you were asked to make a list of animals that eat the flesh of other animals. Prove that we prefer to eat animals that live on plants rather than animals that live on other animals.

5. Make a list of animals that give us food in more than one way.

6. Make a list of animals that give us both food and clothing. You will learn more about these animals later.

7. Find out how your butcher keeps meat from spoiling.

Then Read This

Most of you have seen a circus, and visited the lions and tigers and elephants in their tents. In

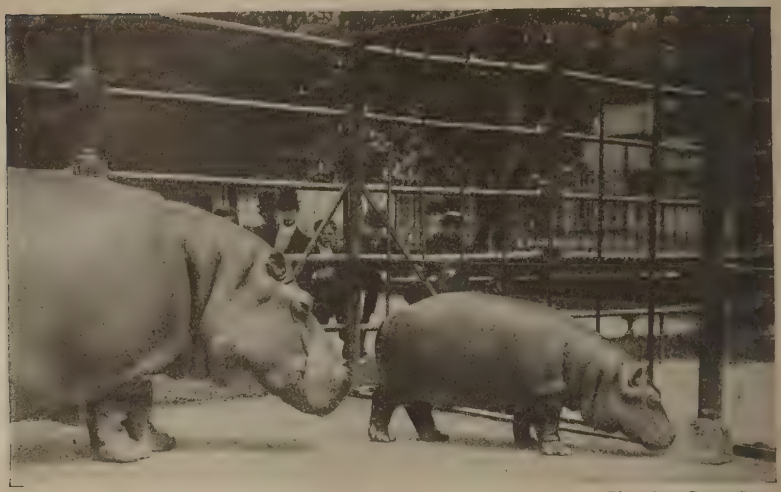


Photo from Brown Bros.

In a zoo

Do you know a hippopotamus when you see one?

big cities like New York there are collections of animals that stay in one place and live in large, handsome buildings instead of in tents. Such a collection is called a *zoo*. Boys and girls visit it to get acquainted with strange-looking animals.

What would you think of a zoo that had a cow in it so that boys and girls could see the kind of animal that gives them milk and that they eat when they eat roast beef? The zoo in St. Louis really has a cow for people to see, although St. Louis is right in the middle of the part of our country where the cattle are raised. Many St. Louis children have never seen a cow outside of a zoo, because the streets and the houses and the tall stores and the railroad

tracks do not leave any room for fields for cattle to live in.

Thousands and thousands of city children have never seen a cow, though they drink cows' milk every day and see cows' flesh every time they pass a

© Brown Bros.

Do you see why there is no room for cows here?

butcher shop. So you can see why *somebody* has to raise a great many more cattle than he needs for himself. For this reason many farmers raise every year more cattle and hogs, and sometimes sheep, than they and their families could eat in a lifetime. They sell them and buy things that the city people make, such as shoes and tools.

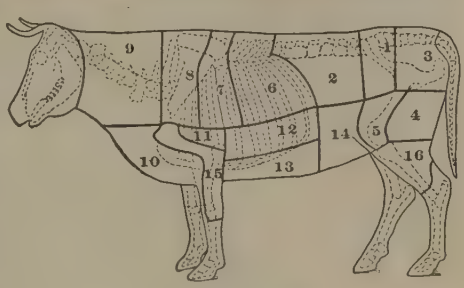
You have already learned that cattle and hogs like corn better than they do most other foods. For this reason, most of the cattle in our country are raised where corn is grown. Farm animals are often called *stock*. The stock farmer lets his cattle and hogs eat fresh, growing grass in the spring and summer. In the fall and winter he feeds them corn in the fields or from his silo. Then they get fat and sleek and he calls them *corn fed*. He drives them to the railroad and up a slanting walk with fences on both sides into cattle cars. Here the poor cattle are sometimes squeezed in so tightly that they *moo, moo* much of the way to the city where they are going to be killed. But the men who care for them on the train feed them and are kind to them.

Photo by H. A. Strohmeyer, Jr.

Beef cattle

Some of the animals are taken to near-by slaughter houses where they are quickly killed, or *slaughtered*, and skinned and cut up for the butcher to sell as meat. You will be interested to see how the *car-*

cass, or body, of the cow is divided into many *cuts*, or parts with names, so that people can order just what they want.



The cuts of beef

Here are the cuts that the numbers stand for. Do not try to remember these names.

1 and 2 = loin (1 = sirloin)	7 = blade	12 = plate
3 = rump	8 = chuck	13 = navel
4 = round	9 = neck	14 = flank
5 = top sirloin	10 = brisket	15 = shoulder
6 = prime ribs	11 = cross-rib	16 = leg (shin)

Many other cattle and hogs and sheep are sent to *packing houses* in the cities. These are factories in which the animals are slaughtered and every part is used. There are such factories in most of the cities in the corn belt. Some of them are very large. The largest are in Chicago.

In a packing house hundreds and hundreds of animals are slaughtered every day. The skins, or *hides*, are saved for making leather. Thousands of carcasses are cut in two and hung in long rows in cold rooms where they will not spoil. Many parts of hogs are made into sausage by machinery. The upper parts of the hind legs of hogs are made into hams, and their sides are made into bacon. The fattest hogs are used chiefly for lard. Why do you suppose the fat hogs are best for lard and the lean hogs for bacon? The hoofs of cattle and hogs are made into gelatin and glue, and the heads into

Photo from Brown Bros.

The cooling room in a packing house

head cheese and soap. The hog bristles are used in making brushes.

Soldiers who are marching or fighting cannot always get fresh meat. People who are camping or who are traveling by automobile cannot cook meat easily even if they can buy it. And sometimes when your mother is busy she finds it easier to open a can than to cook a roast or a steak. So the packing houses can meat for soldiers and travelers and busy mothers just as the cannery cans corn. Have you ever eaten sandwiches made of canned tongue or corned beef?

So far we have not mentioned the tame birds

that we use for food. We call such birds *poultry*. In the country and in small towns almost everyone keeps chickens, and if you wake up in the early morning you can always hear a rooster crowing. In the big cities people do not have room for chicken houses,

© *Brown Bros.*

Newly hatched chickens on a poultry farm.

These little chickens were hatched out in an *incubator*. An incubator can keep many more eggs warm than a mother hen.

and you never hear a rooster crow or a hen cackle. Yet you can always buy chickens or eggs. In a big city the people eat in a single day more eggs than your schoolroom would hold. Somebody, then, must keep the hens that lay all these eggs. These hens, or most of them, live on poultry farms where the

farmers make a business of keeping hens to lay eggs to sell to the city people. What do you suppose they do with the money that they get for their eggs?

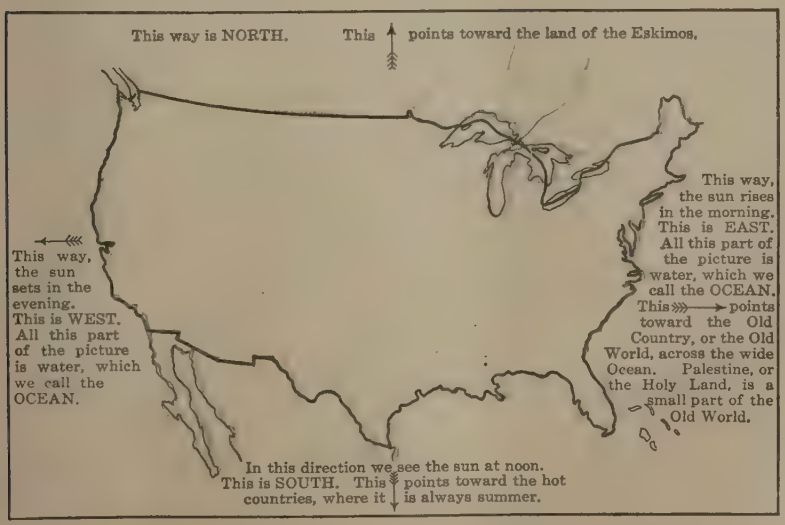
Making a Picture of Our Country

In Chapter 5 you learned that our country is called the United States. Of course you cannot understand *where* things happen in our country until you know something about its shape. This picture shows you the shape of our country:

Get your teacher to point to the part of this picture where you live.

The right side of the picture shows the part of our country nearest the rising sun. You have already learned that this is called the *east*. The left of the

picture shows the part nearest the setting sun. That direction is called the *west*. The bottom of the picture represents the direction in which we see the sun at noon. That way is *south*. The south side of our country is nearest the hot countries where there is never any snow or ice. The top of the picture represents the *north*, from which the cold winds blow. Beyond the north edge of our country, a long, long way off, is the country of the Eskimos, where it is winter most of the year. Let us say this on the picture:


This way is NORTH.
This points toward the land of the Eskimos.
This way, the sun rises in the morning. This is EAST. All this part of the picture is water, which we call the OCEAN.
This points toward the Old Country, or the Old World, across the wide Ocean. Palestine, or the Holy Land, is a small part of the Old World.
This way, the sun sets in the evening. This is WEST. All this part of the picture is water, which we call the OCEAN.
In this direction we see the sun at noon. This is SOUTH. This points toward the hot countries, where it is always summer.

Let us now print the words WHEAT and CORN on the parts of the picture that show the parts of our country where the most wheat and the most corn are grown:

Notice that there are three parts of our country where a great deal of wheat is grown, and one big part where most of our corn is grown. What animals are often raised on corn? Let us see:

So far, you have read about these large cities in the United States: New York, Chicago, St. Louis, Minneapolis, Buffalo. All except Minneapolis and Buffalo are shown in the picture on page 53. All the cities that you have read about, and many others, are shown on a larger picture of our country in the last chapter of this book. Find this picture, and find these cities on it. Is New York farther east or west than Chicago? Is St. Louis farther north or south than Minneapolis? Would you expect it to be warmer or colder in Minneapolis than in St. Louis?

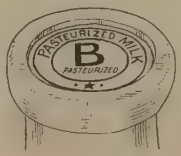
7. HOW WE GET OUR MILK, BUTTER, AND CHEESE

First Do These Things

1. If you live in the country, and your father keeps cows, find out what he does to keep your milk cool and clean.

2. If you live in a village or small city, find out what your milkman does to keep your milk cool and clean before he brings it to your house.

3. If you live in a large city and get your milk in bottles, find out whether the caps on the bottles say *Grade B*, *Grade A*, or *Certified*. Find out what each of these three kinds of milk costs.



4. Find out, if you can, where your butter comes from. If it comes from a *creamery*, try to learn why butter should be made in a creamery.

5. Make a list of things to eat in which cheese is used.

Then Read This

If someone should ask you, "What is the most necessary food in all the world?" you might at first

not know what to answer. You might say "Bread," or "Meat," which you have already read about. You might forget that the most important food in the world is something which we *drink*. Milk feeds you when you are hungry, and satisfies you when

© Brown Bros.

Putting the caps on bottles of milk

you are thirsty. A strange food, surely! Yet if one great city should be unable to get milk for even a few days, hundreds of babies would die. You and I can eat other things when milk is taken away from us, but Baby cannot eat anything but milk.

Whatever else we have, then, we *must* have milk. Milk spoils more quickly than most other foods, so

we must have *fresh* milk. Milk cannot be brought farther than a day's or a night's journey on a railroad train, if it is to stay fresh.

A good many different animals give milk. In the Old World across the ocean many people drink goats' milk. The owner of the goats drives them from house to house and milks them when he finds someone who wants to buy the milk. Why do you suppose he does this instead of milking the goats first and bringing the milk to market?

© Brown Bros.

In some countries many people use goat's milk.

In our country we prefer the milk of cows, and almost all the milk we use is cows' milk. It keeps one cow busy eating fresh grass or dried grass (which we call *hay*) or corn, and chewing her cud and digesting her food in her four stomachs, and making milk out of it, to supply about five people with milk and the things that are made from milk. So for every thousand people in

the city, or in the country, there must be two hundred cows within a day's journey from where they live. Explain why.

It is easy for farmers to keep enough cows to supply their own families with milk, and to have enough left over to sell to the people in near-by villages and small cities. But in a great city like New York there are so many people that if they could all march by you, four abreast like soldiers, it would take them three whole weeks to pass you, marching day and night! It would take the people of Chicago ten days to pass you, and the people of Philadelphia nearly a week. Just think how many cows are needed to give milk for all these people!

These cows live on *dairy farms*, all within a day's journey of the cities where their milk is going to be

A dairy farm

drunk. Near each large city is a section of the country where the cows live that give it milk. On page 53 is another picture of our country. It shows the ten largest cities. The part of the country near each city is where the cows live that give milk for the city people. For city babies must have milk to keep them alive, and city boys and girls must have milk to keep them healthy.

In the summer the cows on the dairy farms eat mostly fresh grass. Besides the fresh grass that

© Herbert W. Taylor, Cambridge

Just before feeding time in a clean dairy barn

the dairy farmer lets the cows eat he grows big fields of grass, which he dries and makes into hay for food for his cows in the winter time. Often too, he grows corn and feeds part of it to his cows fresh and puts a lot more into his silo for winter feed. In Chapter 6, you learned that when you eat bacon or beef you are really eating made-over corn. Sometimes when you drink milk you are doing the same thing. Does this help you to understand how milk can be a food?

You would be interested to see how careful dairy farmers are to keep the milk clean. Old-fashioned barns were very dirty and full of flies. Nowadays dairymen keep their barns and their cows as clean as they can, and they shut out the flies with screens. When dust and dirt get into milk, it spoils very fast. Spoiled milk makes babies sick. Many more babies have lived to become big boys and girls since the dairy farmers began to be so careful.

Most of the milk that goes to the cities is *pasteurized.* That means that it is heated and cooled again. This kills the many tiny plants, smaller than the smallest speck of dust, that get into the milk no matter how careful the farmer may be. When these are killed, the milk does not sour so quickly. The very best milk has the smallest number of these tiny plants. It is sometimes bottled *raw*, that is, without being pasteurized. The many big cans of

pasteurized milk and the bottled raw milk are sent to the cities in long trains of railroad cars that are kept cool like ice boxes. The milk is kept cool be-

© Brown Bros.

A refrigerator car where milk is kept cool

cause the tiny plants that make milk sour do not increase in number so fast in cool milk as they do in warm milk. In the cities the milk is taken out of the big cans and put into bottles. Then the milkmen take it to the houses in wagons.

Did you ever think how many people must work before you can have even a simple food like milk?

Perhaps you think we drink all the milk cows give. If you do, you have forgotten about cheese, which

is made from milk. You have also forgotten that cream comes from milk and that butter is made from cream. Many dairymen who live too far away from the cities to send them milk make cheese from the milk instead. Others put their milk into a wonderful whirling machine, called a *separator*, that

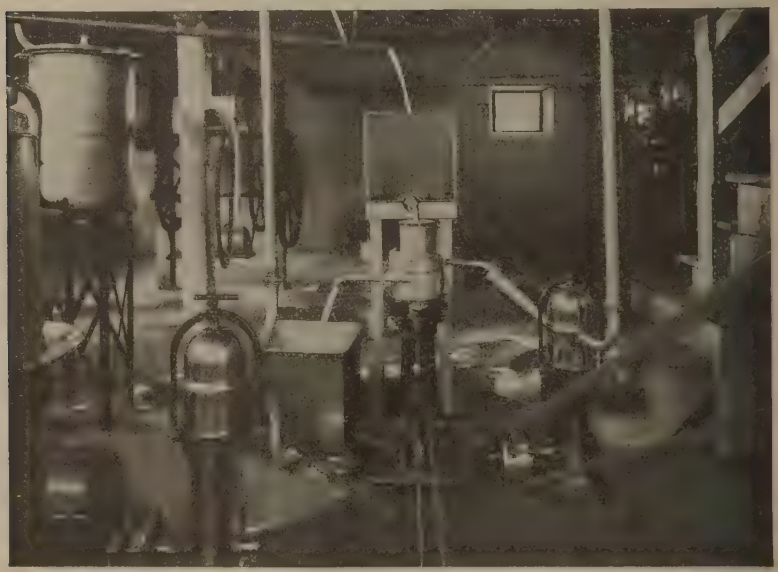


Photo from Brown Bros.

A separator at work

pours the cream out of a little spout and the skim milk out of a big spout. Then they make butter out of the cream. Some day, perhaps, you will learn how dairymen make butter and cheese.

We learned in Chapter 5 that men put corn into cans to keep it from spoiling. Many other things are kept fresh by canning. Milk is one of these. Canned milk

is thick, like cream, and many people like it just as well. Some dairymen can all the milk their cows give.

Now Answer These Questions

1. What do we mean when we say that milk is a food?

2. Why is milk the most necessary food there is?

3. What is meant by *hay?* By a *dairy farm?* By *pasteurized* milk? By *raw* milk? By a *separator?*

4. What important kind of food is made out of cream?

8. HOW WE GET FOOD FROM THE SEA

First Do These Things

1. Get your teacher to show you a globe. A doll or a statue looks more like a real person than a flat picture does, because it has the same *shape* that a person has. If we were high up in the sky and could look down upon the big world on which we live, it would look like a globe because the world and the globe are both round. The earth *looks* flat to us because it is so very large that we see only a tiny part of it at one time. Put your eye close to some big, round object like a stove or a tea-kettle or a lamp shade. Does the part of it that you now see look round or flat?

2. On the outside of a globe is a picture of the land and water on the surface of our world. Have your teacher point out to you what parts of this picture show land and what parts show water. See if you can find, on this round picture of the world, the part that looks like the picture of our own country on page 46 or on the cover of this book.

3. Find the Atlantic Ocean. This is the great ocean that the early settlers of our country crossed when they came from the Old World.

4. Find the Pacific Ocean. Which is larger — the Atlantic or the Pacific Ocean?

Then Read This

If you will look closely at your globe, you will see that there is a great deal more water than land on the surface of our world. Great ships that cross the ocean nearly as fast as an automobile takes you for a ride, go for days and days without ever coming in sight of land.

A fish, you know, lives in water. Some fish live in salt water like that of the ocean, which is so salty that you cannot drink it. Others like fresh water better, and live in lakes and rivers. Get your teacher to show you some fresh-water lakes and some rivers in the picture of the United States on your globe.

There are many kinds of fish, just as there are many kinds of land animals. Some are longer than a man; others are very small, like the minnows that you sometimes use for bait when you go fishing. Little fish eat the plants that grow on the bottom of the ocean (or the *sea*, as we often call it) where the water is shallow. Large fish eat both plants and little fish. For this reason, there are many more fish where the water is shallow than where it is deep.

We do not know how long ago men discovered that fish were good to eat. But we do know that

Photo from Brown Bros.

"Some fish are longer than a man."

it was very, very long ago. At first men caught the fish in lakes and streams, as you do now if you live in the country. When men first learned to travel on the ocean in little boats, they found that they could catch bigger fish there. The ocean is so much larger than even the largest lake or river that new salt-water fish hatch out, from the eggs that the mother fishes lay, faster than men can catch them and kill them. So men discovered that the ocean had an almost endless supply of food for them. Because there are so many fish in the sea, fish is usually cheaper to buy in a market than beef or pork or mutton.

Perhaps you would like to know how men catch

different kinds of fish. When you go fishing, you use a hook with bait on it and a strong line and a pole with which you jerk in the hook and line when a fish bites. Many fish are caught in just that way; yet it is a slow way, because only one fish can be caught at a time with a hook and line.

© Brown Bros.

Fishing with a net

The fishermen of many countries fish in a faster way. They draw long, wide *nets* through the water, or place them where the water flows through them. The holes between the strings in the net are so small that the big fish cannot squeeze through them, but they are large enough to let all the baby fish get away. When many fish have been caught in a net, the fishermen drag it in to

the shore or lift it over the side of a boat. The fish are as helpless in the air as you would be in the water if you could not swim, and they quickly die.

One of the most important kinds of food fish is the cod. Many fishermen earn their living by catching cod in the Atlantic Ocean. They go far out to sea in boats and bring the cod to Boston and other cities on the *coast*, or edge of the ocean. They catch some of the cod with nets. They catch others with *trawls*, or very long lines that have many short lines with baited hooks hanging down from them.

Another very important food fish is the salmon.

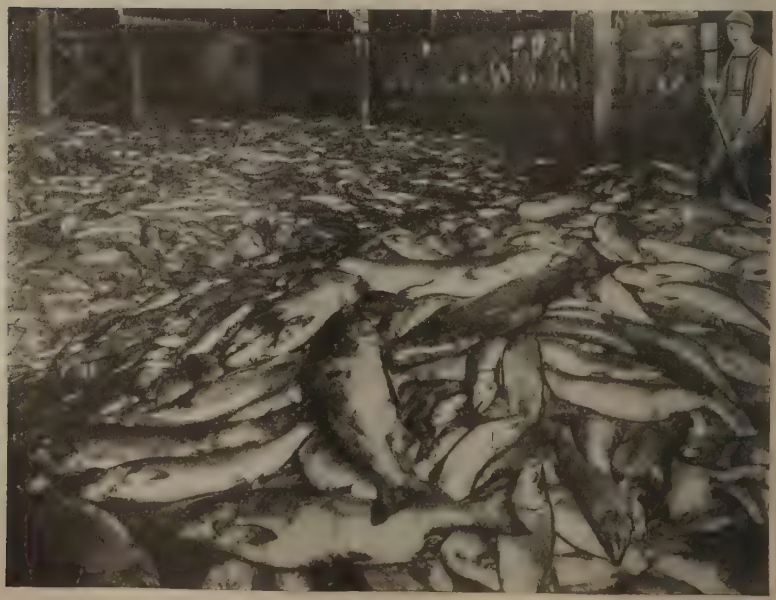


Photo from Brown Bros.

Salmon, in a factory where they are canned

The salmon is hatched from its egg in a little stream far from the ocean. Then it swims down the stream, which gets bigger and bigger as other streams join it. At last it swims out of the fresh water of the river right into the salt water of the ocean. There it lives for years, traveling we know not how far along the coast or out into the open ocean. Now a great many big rivers flow into the ocean, and a great many little streams flow into each big river before it reaches the ocean; and you might suppose that one river would look much like another to the salmon. But the salmon in some wonderful way always knows its home river and its home stream. When it is old and ready to lay its eggs and die, it leaves the salt water of the ocean and swims up the fresh water of just the right river and just the right little stream to the very little creek or rivulet where it began life as an egg. And there it lays its eggs.

A great many salmon are hatched out in the streams that flow into the rivers of our country that flow into the Pacific Ocean. All these salmon try to find their way back to their old homes. So fishermen wait for them near the *mouths* of the rivers, or the places where rivers flow into the ocean, and catch great numbers of them in nets and traps.

You will remember that men have found ways to keep corn and meat from spoiling. Fish spoils very

quickly if nothing is done to keep it from spoiling, so men have invented ways to keep it good to eat for a long time. Many cod are sold fresh, but many more are split open, salted, and dried. Have

Photo from Brown Bros.

Drying codfish

you ever eaten salted codfish in the form of codfish cakes? Many salmon are caught a long way from where people live who would like to eat them. So they are cut up and put into cans and cooked. Then people buy the cans of salmon.

Now Answer These Questions

1. What is the shape of the world, or the *earth?*
2. Is there more land or water on the surface of the earth?
3. What is meant by the *sea?* By the sea *coast?* By the *mouth* of a river? By a *net?* By a *trawl?*
4. How are codfish caught? How are they kept from spoiling?
5. Tell the life story of a salmon.
6. What kinds of food fish have you eaten that we have not mentioned?

9. HOW WE GET OUR VEGETABLES AND FRUITS

First Do These Things

1. Here is a list of common garden vegetables. Put in one list those of which we eat the root; in another list, those of which we eat the stalk; in a third list, those of which we eat the leaves; in a fourth list, those of which we eat the seeds or the part that contains the seeds. Can a vegetable be in more than one of these lists? — Potatoes; lettuce; beets; cauliflower; radishes; turnips; cabbage; asparagus; squash; spinach; onions; peas; beans; tomatoes.

2. Make a list of all the kinds of berries that you know.

3. Make a list of all the kinds of fruit that you have eaten. Which of these have you seen growing?

Then Read This

You would soon become ill if you did not eat plenty of vegetables and fruit. Every year doctors learn more about the value of fresh fruit and vegetables even for very young children. Nowadays, Little Brother has orange juice for breakfast and spinach for dinner when he is only a few months old.

People who live in the country, or in small cities where they can keep gardens, can of course get fruit and vegetables very easily. But people who live in cities, where there is no room for orchards or gardens, must buy vegetables from country people. City people make many of the things that country people need; but people could not live in cities at all unless country people sold them grain and milk and vegetables and fruit.

By this time you know what is meant by *north*. The northern part of our country is shown in the top part of the pictures on pages 46, 47, 48, and 53. Beyond it are the cold countries. The *southern* part of our country, or that which faces the *south*, is shown in the bottom part of those same pictures. Beyond it are the warm countries where it is always summer. As you go from north to south, the winters get shorter and the summers get longer; and as you go from south to north it is just the opposite — the winters get longer and the summers get shorter.

What farmers call the *growing season* begins with the last heavy frost in the spring and ends with the first heavy frost in the fall. The southern edge of our country has a growing season between two and three times as long as the growing season along the northern edge. This means that in the South farmers can grow much larger quantities of vege-

Growing beans in the South

Garden vegetables can be grown all winter in the South.

tables than the farmers in the North. So in the South there are many farms where potatoes or onions or tomatoes or beans or other garden vegetables are the chief crop. Even in the coldest winter weather the people of the North can buy fresh vegetables from the farmers of the South. The vegetables are kept warm on the way in heated railroad cars.

Farmers who live near large cities even in the North often make a business of raising vegetables to sell. The cities are so near that the vegetables

This is what the North looks like at the time of year when the last picture was taken in the South.

raised by these farmers can be hauled to the stores very easily. These *home-grown* vegetables are cheaper than those that come from the South, and many more people can afford to buy them.

It would take many more chapters to tell you how and where your favorite fruits are grown. Apples grow best where the summers are cool and short. For that reason, apple orchards grow chiefly in the North. Peaches are grown about equally well in the North and in the South. So are strawberries, but strawberries ripen earlier in the South.

On page 73 is another picture of our country. It shows you the parts where it never gets very cold and there is no real winter the year round. Here there

An orange orchard in California

are many orchards of oranges and grapefruit, which cannot stand cold weather. The trees grow in long, straight rows. Many, many oranges hang to the branches of the orange trees like so many golden balls on a Christmas tree. The grapefruit grow in thick clusters on trees that are usually not quite

so tall as the orange trees. Think of a cluster of grapes, and see if you can tell how the grapefruit got its name. When the oranges and grapefruit are ripe, they are cut off the trees with scissors so as not to injure the stems. Then they are taken to a *packing house* and washed and sorted by machinery. Did you ever notice that all the oranges or grapefruit that come in one box are of about the same size?

Photo from Ewing Galloway, N. Y.

A packing house

At the right, in the back part of the picture, you can see boxes of oranges. In front, oranges are being sorted and wrapped.

We have already learned that foods which spoil easily, like vegetables and fruits, can usually be kept from spoiling by *canning*. Think how unpleasant it would be to eat all our peaches and pears and tomatoes in the summer and to have none left for the winter! Before the tin can was invented, and before women learned to "put up" fruit in glass jars, the farmers grew only enough to feed people for a few weeks in the summer. Now people can have almost any fruit the year round.

In many countries the people are very poor, and eat only the fruits and vegetables that are grown on their own lands. Our country is very rich, and when people in other lands grow fruits or vegetables that we want, we buy them.

© Brown Bros.

A banana tree

Notice the bunch of bananas just to the right of the middle of the picture.

One of the fruits that you like best is the banana, but almost all our bananas come from warm countries in the far south. Banana trees grow in great *plantations*, or orchards, on the lands all around the Caribbean Sea. Find the Caribbean Sea on your globe. The banana tree has big leaves, as tall as you are. On the tree the bananas point upward instead of downward as they do in stores. Ask your fruit dealer why he hangs bananas upside down.

We get many other fruits from distant lands. From the Old Country across the Atlantic Ocean

we get figs and dates. These are packed tightly together to save room, since they have to come so far. Dates, like coconuts, grow on palm trees, but the date palm is not so tall as the coconut palm. We grow figs also in our own country, but we eat many more than we grow.

When we buy from distant lands things that we want but do not grow or make, we are said to *import* those things. You will learn in the next two chapters about other foods that we import.

Now Answer These Questions

1. Why do country people have to raise more fruit and vegetables than they can use themselves?
2. Point toward the cold countries of the north. Point toward the warm countries of the south.
3. What is meant by *growing season?* By *home-grown* vegetables? By a *packing house?*
4. Is the Caribbean Sea north or south of your home? What fruit comes from the lands around it?
5. What is meant by *importing* things which we want?

10. HOW WE SWEETEN AND SEASON OUR FOOD

First Do These Things

1. Make a list of the things you eat that contain sugar; of the things you drink that contain sugar.

2. Make a class collection of different kinds of sugar. Let one pupil bring a few teaspoonfuls of plain white sugar; another, a little brown sugar; another, a few pieces of loaf sugar; another, a little powdered sugar such as is used in making candy; another, a piece of maple sugar. If you cannot get maple sugar where you live, perhaps you can write a class letter to a class of your grade in Vermont asking for a small sample.

3. Name as many kinds of sirup as you can.

4. Tell what kinds of food you eat without salt. Tell what foods you eat without salt or sugar.

5. Name all the spices that you know.

Then Read This

There is one kind of food that is very necessary but that most of you like so well that you eat more of it than you need. That food is sugar. Even Baby Sister has a small spoonful of it in her

© Brown Bros

"Even Baby Sister has a small spoonful of sugar in her first bottle."

first bottle, and of course we give babies only what is good for them. There is sugar in many of the things that you like best. Sugar, if you do not eat too much of it, gives you strength in much the same way that bread does. But when you eat too much cake or pie or candy, you get so much sugar that it does you harm.

The boys and girls of our country eat a great deal more sugar than the children of any other country. That is because our country is so rich that we can afford to buy almost all the sugar we want. We grow so little sugar in the United States that we have to import most of the sugar

we use. Do you remember what *import* means? In poor countries that cannot import sugar, few of the boys and girls ever have cake or pie, and many of them have never seen a piece of candy. Are you not glad that you live in a rich country?

Brown Bros.

A candy store

About three-quarters of our sugar comes from a plant called *sugar cane.* Sugar cane grows best in warm, moist lands where there is no real winter. For this reason, most of our sugar comes from lands a good deal like the places where bananas grow. Out of every ten pounds of sugar that your mother buys at the grocer's, eight pounds came

from sugar cane. Of these eight pounds, more than seven and a half pounds came from far-away countries where it is warm the year round. Less than half a pound in the whole ten pounds came from cane that was grown in this country.

Photo from Brown Bros.

Squeezing the juice out of sugar cane

We import more sugar from Cuba than from any other country. Find Cuba on your globe. Notice that there is water all around it. It is called an *island* for that reason. Show your teacher other islands on the globe. When most of your fathers and mothers were little boys and girls, our country fought a war to set Cuba free from a country across the Atlantic Ocean called Spain. Find Spain on your globe also.

A field of sugar cane looks much like a field of

Photo from Brown Bros

Hauling sugar beets to the factory

thick, tall, stiff grass. The stalks are something like those of corn. The stalk is the sweet part of the cane. On the sugar *plantations*, or farms, there are mills where the sweet juice, called *sirup*, is squeezed

© Brown Bros.

Getting the sap from sugar maple trees

out of the stalks by heavy presses. Then it is boiled and *brown sugar* and *molasses* are made from it. The brown sugar is sent in ships to cities like New York and Philadelphia and Boston and San Francisco. Here workmen make pure white sugar out of the brown sugar in big factories called *refineries*.

You remember that only eight pounds of each

ten pounds of sugar that your mother buys came from sugar cane. The rest (how much is left?) came from large brown beets called *sugar beets.* Farmers grow a great many of these beets in several parts of our country where it is too cold for

sugar cane to grow. When the beets are full grown they haul them to sugar factories where *beet sugar* is made out of them. Beet sugar is exactly like *cane sugar.* Is it not strange that the same thing can be made from two plants that look so different as a beet and a stalk of cane?

Sugar and molasses are also made from kinds of grass called *sorghums.* Many farmers in the southern part of our country grow sorghums. There

is still another kind of sugar that you are sure to like if you have ever tasted it. That is *maple sugar*. It comes from the sap of the sugar maple trees. Many of these trees grow in a part of our country called Vermont.

On page 83 is a picture of our country and of the lands just south of us. It shows where most of our sugar comes from. We also get sugar from some islands in the Pacific Ocean that belong to our country. Why can we not show these on this picture?

Here is a riddle. I am thinking of a very necessary food that you cannot eat by itself; yet many of the foods that you eat every day would not taste well without it. Cattle and horses and wild animals like it. And it is used to keep fish from spoiling.

Of course you have guessed it. Salt! When we said, in Chapter 2, that we eat only plants or plant food that is stored in animals, we did not *quite* tell the whole truth. For the pinch of salt in our oatmeal or on our meat is neither plant nor animal; it comes from the earth. Valuable things that we take from the earth, that are neither plants nor animals, we call *minerals*. Digging minerals out of the earth is called *mining*. Salt is mined in many parts of our country. Some day, perhaps, you will learn how we get salt from the earth.

We add many things besides sugar and salt to our food to give it taste or flavor. You have all seen

Photo from Brown Bros.

Mining salt

rows of cans containing *spices* on your kitchen shelves. Most of our spices come from large islands called the East Indies far away on the other side of the world. Find these islands on your globe.

NOW ANSWER THESE QUESTIONS

1. Where does most of our sugar come from?
2. What kinds of plants give us sugar?
3. What is an *island?*
4. What is *brown sugar? Cane sugar? Beet sugar? Sorghum?* A *refinery?*
5. What is a *mineral?* What is meant by *mining?*
6. What mineral food do we get from the earth?

11. HOW WATER GIVES US FOOD AND DRINK

First Do These Things

1. Find out where the water comes from that you use in your home. If you live in the country, this will be easy. If you live in the city, find out where the water pipe enters the building in which you live. Find out also how the city gets its water and how it brings it to your home.

This is a part of the big pipe through which Los Angeles (page 53) gets its water.

2. If you live in the country, find out what your father has done to make sure that you have pure water to drink. Water may look clear and taste pure yet be unsafe to drink.

3. Find out why young children ought not to drink coffee.

4. Make a list of the uses of water. Do not forget bathing and putting out fires.

Then Read This

Water is the most necessary thing in the world. If you were shipwrecked and came to an island, you would look for fresh water before anything else. You could eat little or nothing for many days, and still live. Unless the weather were cold, you could get along for a long time without shelter or clothing. But without water to drink you would soon die.

Every living thing needs water and has water in it as long as it lives and grows. Trees are full of water — so full that *green* wood, or wood from which the water has not been dried out, will not burn easily in your fireplace or your stove. Grass is full of water; when it loses the water that is in it, it becomes hay. Grapes are full of water; when the water is taken out of them, they become raisins. There is more water than anything else in milk and fruits and vegetables and meat. There is a great deal of water in our own bodies.

People cannot live where there is no water. In some parts of the world it rains so much that people have a great deal more water than they need. In other parts of the world so little rain falls that only a few plants and animals can live. Such places are called *deserts*. Sometimes men can bring water

Photo from Brown Bros.

A desert

Camels can go a long time without water; so they are used for travel on deserts. People now ride in automobiles, too, when they cross deserts.

even to a desert by digging wells and pumping water up from deep down in the earth. Sometimes men can dig a ditch many miles long from a lake or a river to a desert, and let water from the lake or the river flow on to the desert. But people cannot live on a desert unless they can bring water to it.

Perhaps you will be surprised to learn that our water all comes from the ocean; but it reaches us

Photo from Brown Bros.

Leading water on to a desert through a ditch

in a very roundabout way. You remember that the ocean covers three quarters of the earth. Water is going into it and out of it all the time. When moving air, or *wind*, blows over the ocean, it sucks up part of the ocean water. We cannot see it do this, any more than we can see the air itself; but when enough water has been sucked up so that the air is damp, thousands of thousands of little raindrops come together and form a *cloud*. When the cloud has so many drops that it cannot hold them all, they fall one by one to the earth. That is what we see when it rains.

All round things roll down hill. So do raindrops; but they roll along so easily that water will flow a

Photo from Brown Bros.

Clouds are formed over the ocean.

very long way to any place that is the least bit lower than another place. So when rain falls, many of the drops roll down into the cracks in the soil and keep going down, down, far into the earth. This is the water that we reach when we dig a well. Other raindrops, when the cracks in the soil are full and no more water can sink into the earth, come together and form little streams. Little streams come together and form big streams, or *rivers*, that flow on and on and down and down until they reach the ocean from which they really started. Why do we say that they started from the ocean?

People get water for their own use in many different ways. Some people catch rain in barrels and cisterns when it falls. Others dig wells and get the raindrops that ran down the cracks in the soil. Others get water from lakes and rivers. Why do not people get drinking water from the ocean?

The people of any large city need a great deal of water. Each family cannot have its own well, so the city must take water in pipes through the streets to the houses. Some cities pump water from deep wells. Others take water from near-by lakes or rivers; but some cities have to bring it in pipes and ditches from lakes or rivers many miles away. Do you suppose cities bring water from places that are higher or lower than themselves?

Whatever we may drink, we are drinking mostly water. For coffee and tea are really just flavored water, and you have already learned that there is more water than anything else in milk. A great many people in distant lands earn their living by growing plants that we do not grow but that we like to put into water to *flavor* it. We have just named the two most important drinks that are made in this way. What are they?

Our coffee is grown in many of the warm countries of the world. But the country that sends us the most coffee is Brazil. Find Brazil on your globe. Notice that it is much farther south from

us than even the Caribbean Sea. It is in the part of the world called South America. Find that name also.

Coffee grows on trees, in berries which look something like cherries. The coffee bean is the hard inner part of the coffee berry, just as the cherry

© Brown Bros.

Tea

© Brown Bros.

Coffee

stone is the hard part inside the cherry; but most coffee berries have two beans.

The tea that we put into hot water to flavor it is really just the dried leaves of bushes that are grown in India and Japan and a few other countries. Find India and Japan on your globe. Notice that India is a country in Asia, the largest body of land in the world. Large bodies of land, like Asia and South America, are called *continents*. You have already learned that the name of the *country* in

which you live is the United States. Look on your globe and find the name of the *continent* in which you live.

Cocoa and chocolate are made from the cacao bean, which is grown in lands near the Caribbean Sea. What other two foods have we learned that these lands send us?

A Review of Foods

If you have a sand table in your school, have your teacher help the class to make on it a picture of the United States shaped like the picture on page 46 or the one on the cover of this book.

Make four little sign-boards and stick them into the sand pointing in the proper directions. On one sign print, "THIS WAY IS NORTH." What shall you print on the other three?

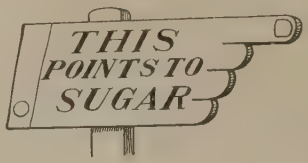
Put all the samples of foods, like wheat kernels, that you have brought to class on the parts of the United States where they are grown.

Cut out pictures of cows and pigs and put them where most of our cows and pigs really live.

When you cannot get samples of any food, cut out pictures from advertisements or from labels on cans.

Make a class list of all the most important things that you have to eat. Show on the sand table where each comes from. If it comes from a distant

country, put a sign like this at the edge of the sand table:



If there is not a sand table in your school, draw a picture of the United States on a large sheet of wrapping paper, using crayons.

12. WHAT WE WEAR

First Do These Things

1. Make a list of *materials*, that is, of kinds of cloth and other things, that your clothing is made of. Do not forget shoes, rubbers, or hats.

2. Get your mother or your teacher to tell you the chief differences between cotton, woolen, and silk cloth. Which of these kinds of cloth is likely to be the thickest? The smoothest? The warmest? The shiniest?

3. Prove that we need clothing for the same reasons that we need shelter.

Then Read This

In the last ten chapters you have been learning how very useful plants and animals are to us. You have learned that we should have nothing to eat, and should quickly die, if we lived in a desert and could not bring in, or import, food from places where it can grow.

Perhaps you never thought of it, but we wear clothes that come from plants and animals just as truly as we eat plants and animals. We eat a very, very few things, like salt, that are neither plant nor animal, and we wear a very, very few things, like

the hooks and eyes in dresses and the nails in shoes, that do not come from plants or animals. But everything that we wear, like everything we eat, is made *chiefly* of plant or animal materials.

Boys and girls who live in the country may think that this is very strange. You never saw shoes growing on trees like apples, or silk cloth hanging like cobwebs from the branches. How, then, are shoes and silk cloth made? Men and women make them out of animal materials. Men and women also make things to eat, like pies, out of plant and animal materials.

Photo by the author

A caribou

The great difference is this: We can eat many kinds of food without changing them much from the form in which they grew. But everything that we wear (except perhaps furs) has to be made over so that you would hardly know it, before it is ready to wear.

In very cold countries, like those where the Eskimos live, animals grow long, shaggy fur. The caribou and the walrus and the seal are perfectly comfortable in the coldest winter weather; so when

the Eskimo kills one of these animals he not only eats his flesh but he takes his coat of skin and fur and uses it for clothing. His wife makes shirts and trousers and even boots out of the skins, or *hides*, for him and for his family.

From "The Friendly Arctic," by Vilhjalmur Stefansson. By permission.

This little Eskimo child wears the skins of animals for clothing.

Many animals live in the country that lies between our land and the land of the Eskimos. Men called *trappers* catch some of these animals in traps in the winter time, when their fur is longest. When the trappers have caught them far out in the snowy forests, they kill them and skin them. Once or twice a year they bring the skins in canoes down the rivers to the towns and sell them for food and

clothing and tools. Then *furriers* make fur coats out of the skins, in far-away cities of our country like St. Paul and St. Louis.

Turn to your globe again. By this time you know which way is north on your globe. What is the name of the large country just north of ours

"The dark-skinned people who live there do not need much clothing."

in North America? Eskimos live along the northern edge of that country, where the winters are almost twice as long as the summers.

You have read about the lands in the far south where it is always summer. The dark-skinned people who live there do not need much clothing. Some of them wear loose garments made of grass. Some of them, who have not yet learned the ways of white

men, wear hardly any clothing but decorate their faces and limbs with strange ornaments that would not seem at all pretty to you or to me. When these dark-skinned people get acquainted with white people and learn how white people dress, they quickly copy their clothing and buy cloth that white traders carry to them in ships.

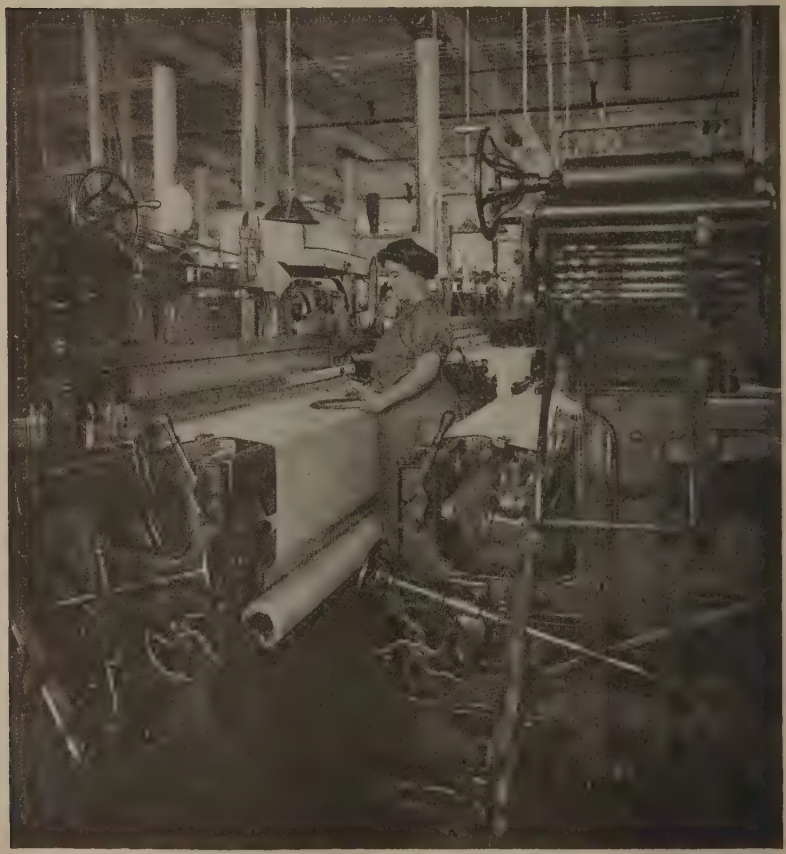
Some of these warm lands are the East Indies, which you have already read about. Others are in the middle part of the great continent called Africa, which you can easily find on your globe. Still others are in the middle part of South America. When you spin your globe around on its support, notice that these warm lands, where it is always summer, form a sort of band or belt around the middle of the earth.

Between the very warm countries and the very cold countries are other countries, like our own, where summers and winters are of about the same length. These countries are said to have a *temperate* climate. Most of our country has a temperate climate. In such countries people have to have different kinds of clothing in different weathers, for the summers may be very hot and the winters very cold.

Most of the civilized countries of the world have temperate climates, and most of the people in the world live in civilized countries. Civilized people make most of the things they wear out of *cloth*.

Did you ever stop to ask yourself what cloth really is, or what it is made of?

Let us see what we already know about cloth.



Courtesy American Woolen Co.

Weaving woolen cloth

For one thing, cloth is easily bent in any direction; for this reason, it can be made to fit our bodies even while we are changing our position all the time.

Cloth keeps the air next to our bodies warm, but it lets enough air pass through it so that there is always fresh air between our bodies and our clothing. Thick cloth holds in the warmth of our bodies better than thin cloth, and cloth made of some materials is warmer than cloth made of other materials. Perhaps you have already noticed that cloth is made of a great, great many fine threads that are woven together by running a cross thread first over one thread and then under another, like the strands or reeds in a basket. You cannot pull the basket apart because the strands hold one another together; and the threads of cloth hold one another together in just the same way.

We already know that most of the things we wear are made of cloth, and that all cloth is made of thread. Well, then, what is *thread* made of? Thread is chiefly of four kinds; two of these kinds are made of animal materials, and two of plant materials. *Cotton* thread is made of the fine, hair-like *fibers* of the cotton flower, twisted together. *Linen* is made of fibers from the stalk of a plant called *flax*. *Woolen* thread is made of sheep's hair. *Silk* is made of a very fine thread, something like a spider web, that is spun by the silkworm. In the next two chapters you will learn about the ways in which men raise plants and animals to make the thread that they use in making cloth.

Now Answer These Questions

1. What do people wear in very cold countries?
2. What is meant by a *temperate* climate?
3. Why is most of our clothing made of cloth?
4. What is cloth made of?
5. What are four different kinds of cloth?

13. HOW WE MAKE CLOTH OUT OF PLANTS

First Do These Things

1. If you live where cotton is grown, choose one boy or girl to bring a small handful of raw cotton to class.

2. If you live where cotton cloth is made, see if your teacher can arrange to have you visit a cotton mill.

3. Weave something yourself to make sure that you understand how it is done. Some boys and

From Bonser and Mossman's "Industrial Arts for Elementary Schools." By permission

These boys and girls wove cloth in school.

girls who have watched cloth being made have made very simple homemade looms and have woven little

pieces of cloth. If you cannot do this, make a reed or raffia basket and pretend that you are making cloth instead.

Then Read This

In Chapter 7 you learned that if the people of New York City could march past you four abreast, it would take them three weeks to go by even if they marched all day and all night long. That is just another way of saying that there are nearly six million people in New York City. In the whole United States there are eighteen times as many people as in New York City. If all the people in the United States could go whizzing past you in a fast train, with one hundred people crowded in each car and a car going past you every time the clock ticked, it would take the train more than twelve days and nights to run by. Yet in the whole world there are seventeen times as many people as there are in the United States. Most of these people wear cotton clothing. And more than half of all the cotton clothing in the whole world is made of cotton that is grown in our own country.

Cotton grows best in places where the summers are long and it is neither very wet nor very dry. Here is another picture of the United States that shows you where most of our cotton is grown. Is it grown in the South or in the North? Along the sea

coast or back a little way toward the middle of the country?

The cotton plant is really a little bush, not quite so tall as you. If you should visit a cotton field about the time of year when your school begins in the fall, you would see a lot of little fluffy white tufts on the branches, like those in the picture. Each of these tufts is called a *boll*. Inside it are the tiny, hairlike cotton fibers. Each fiber is about an inch long (measure an inch with your ruler) and as thin as a hair. In each boll there are more fibers than you could count, and all the fibers are mixed with the seeds of the cotton.

When the cotton is ripe, the bolls open. Men and women and boys and girls go through the fields, pick the white fibers from the bolls, and put them

A field of cotton

into bags that they carry on their backs or drag behind them. Of course they pick the seeds too, because you cannot pick one without the other. Many, many years ago it used to be hard work to pull the fibers away from the seeds. It used to take one workman a whole day to separate a pound of cotton from the seed. At last a man invented a simple machine, or *gin*, that does this very easily and quickly.

When the cotton has been *ginned*, or separated from the seed, it is squeezed very tightly by machinery into heavy *bales*. Each bale is as heavy as

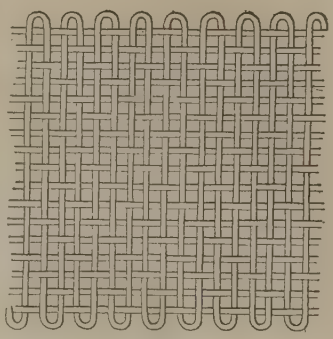
Hauling baled cotton to market

two or three men. Then the bales are sent in ships or railway cars to factories where the cotton fibers are made first into thread and then into cloth. Some of these factories are in cities near the cotton fields. Others are in the northern part of our country near the Atlantic Ocean. Still others are in England. England is a country on an island near the continent called Europe. Find Europe and England on your globe. In England the factories are more important than the farms; so the people of England buy cotton to make into cloth that they can trade for food.

The coarse baled cotton looks much like the stuffing of a cotton mattress. At the factories this cotton is first cleaned and combed by machinery so that the fibers all point one way. Then they are twisted, or *spun*, together into thread, which is wound on spools.

Now the cotton thread is ready to be made into cloth. Did you ever notice how the wires in a window screen are held together? Well, if you could push the wires in the screen together so that no holes were left, you would have wire cloth. Or perhaps you have watched your mother darn a sock. First she makes the thread go over one or two cross threads; then she passes it under the next one or two; then over the next, and so on — *over* every other thread or two and *under* every other thread or

two. When she has mended the hole, she has really woven cloth. Cotton thread is made into cloth in just this way, but it is done very swiftly by machines, called *looms*, that never make a mistake and never get tired. In such a factory, or *mill*, the working people do not make the cloth themselves: they just make the machinery do it for them.



Much of the cotton cloth that you wear is not white, like the raw cotton in the fields or in the bales, but colored. Some cotton thread is *dyed*, or colored, before it is made into cloth. Other cloth is *printed*, or dyed in patterns and figures, after it is woven. Cotton cloth that is dyed *before* it is woven is often called *gingham*. Cotton cloth that is dyed *after* it is woven is called *calico*. Find out which is more expensive.

When the cotton cloth is all made and rolled up into *bolts*, some of it is sent in railroad cars or ships to dry-goods stores where your mother can buy it. Some of it is sent to other factories where it is made into sheets and towels and stockings and underwear and shirts and dresses.

There is another kind of cloth that looks much like cotton but is stronger and wears longer. That

is *linen*. Linen cloth is made from linen thread in the same way that cloth cotton is made from cotton thread; but linen thread is made not from the cotton plant but from another plant called *flax*. Have you ever noticed how stringy the stalks of celery are? The flax plant also has a stringy stalk.

© Underwood and Underwood

Here working people in Belgium are letting flax rot so that they may separate the fibers more easily.

The people of some countries in Europe, like Belgium and Ireland, grow a great deal of flax. When the flax is full grown, they cut it and pile the stalks in stacks. Then they let it rot until it is easy to pull the fibers apart. Linen thread is made out of these fibers. Find out which is more expensive, a

cotton handkerchief or a linen handkerchief. Find Ireland and Belgium on your globe.

Now Answer These Questions

1. What part of the world's cotton is grown in the United States?
2. In what part of the United States is it grown?
3. What is meant by a cotton *boll?* A cotton *gin?*
4. Where are the factories where cotton is made into cloth?
5. What is a *loom* and what does it do?
6. What is *gingham? Calico?*
7. What is linen made of?

14. HOW WE USE ANIMALS FOR CLOTHING

First Do These Things

1. Separate a piece of woolen yarn into its fibers or hairs.

2. Find out what is meant by *knitting*. Knit a few stitches.

3. Try to separate a short piece of silk thread into its fibers.

4. Burn a small piece of cotton thread or cloth; of linen; of silk; of wool. Which two smell a little alike? Which two look a little alike after they have been burned?

5. Make a list of useful things that are made of leather.

Then Read This

In Chapter 12 you learned that part of our clothing comes from animals. You also learned that there are two ways in which we can get clothing from an animal. If he has thick, beautiful hair, or *fur*, we can kill him and skin him and wear his skin over our own. Or we can make clothing out of materials that he gives us.

One of these materials is hair. We could make thread and cloth out of the hair of almost any ani-

mal that has long hair; but the chief long-haired animal that we raise for his hair is the sheep. In fact, the sheep is a very useful animal; for we can cut his hair, or wool, year after year and make it into cloth; or we can slaughter him for his meat, which we call lamb or mutton.

Look on page 46 and read again the meaning of the word *west*. Sheep are raised in all parts of our country, but most of all in the western part. Except on a strip of land along the coast of the Pacific Ocean, not a great deal of rain falls on the western half of our country. But there is enough rain for grass, and farmers who cannot grow crops easily raise sheep and cattle instead. Sheep are not so particular about what they eat as cattle; so where there is little rain and thin grass there are more sheep than cattle.

The sheep that are raised for their wool are driven from pasture to pasture by *sheep herders*. These sheep eat so much that they cannot find enough food very long in one spot. There are often as many sheep in one flock as there are people in a town; so they need a great deal of pasture land.

When the sheep's hair has grown long and shaggy, men cut it off with machines like the clippers that a barber uses when he cuts or bobs your hair. Perhaps you have seen long-haired dogs with their hair cut lion-fashion to keep them cool in summer.

Photo from Brown Bros.

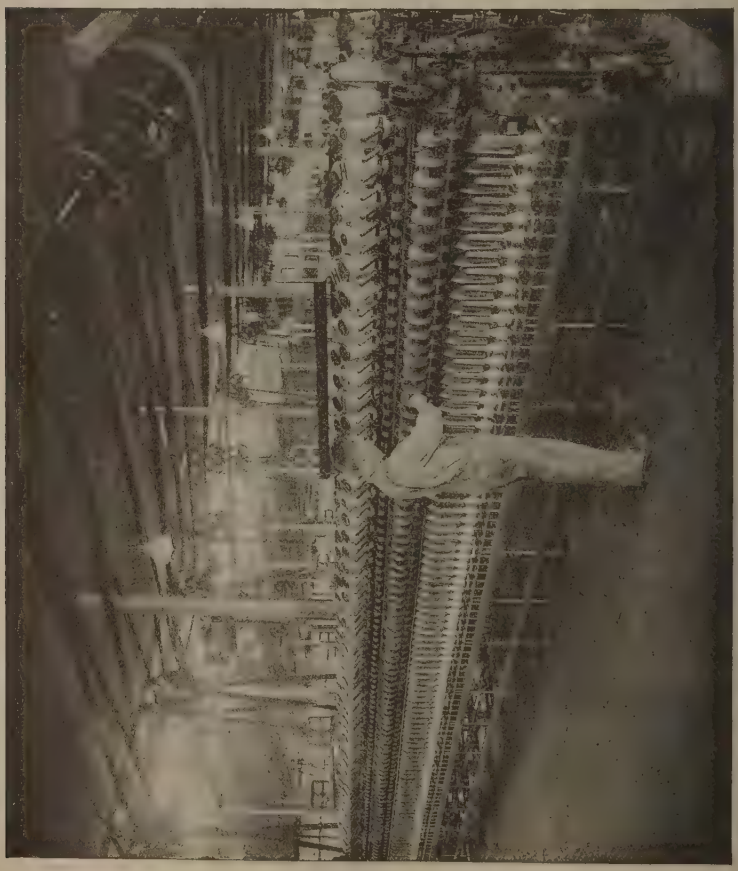
A herd of sheep

A sheep's wool is cut in much the same way, but the *shearers* do not leave it uncut around the sheep's head and shoulders as the man did who cut Fido's hair; and they work more quickly because they have better machinery.

After the wool has been clipped off, it is packed tightly and sent to factories to be made into cloth. Many of these factories are near the Atlantic Ocean in the northern part of our country. You read on page 108 that there are many cotton factories there, too. Wool is combed and spun into woolen thread, or *yarn*, and woven into cloth much like cotton; so it is very natural that wool should be made into cloth in places where people know how to do these things.

There are so many big woolen factories, or *mills*, in our country that all the sheep in the West cannot grow wool fast enough to keep them busy. So we import a great deal of wool from other lands where many sheep are kept. One of these lands is an island on the other side of the world, so big that we call it a continent. Its name is Australia. Another is a country near the tip of South America,

called Argentina. Find these countries on your globe. They are so far south of us that they are *beyond* the belt of warm countries and have a tem-



Courtesy American Woolen Co.

Spinning wool in a factory

perate climate like our own. Do you remember what is meant by a temperate climate?

Countries that have a great many sheep usually

have a great many cattle, too. Our country, as you have already learned, has a lot of cattle. So has Australia, and so has Argentina. Perhaps you will be surprised to learn that wool is not the only animal material for clothing that we import from those

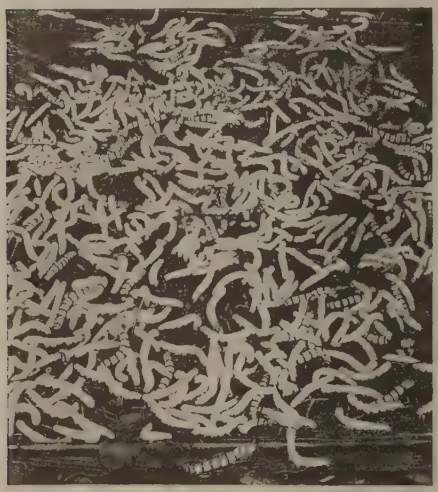
Photo from Brown Bros.

Making leather in a tannery

countries. We also import many thousands of skins, or *hides*, of cattle.

You are wondering what we do with all these hides; for surely women do not wear cow-skin furs! No, but they wear cow-skin shoes, and so do you. For shoes are made of *leather*, and leather is nothing but the skins of cattle or other animals. Great

numbers of hides are sent in railroad cars from our packing houses (Chapter 6) to our *tanneries;* and many more come in ships from distant countries. A tannery is a factory where the skins of animals are made ready for use in shoes and other things that are made of leather. The hair is first taken off by soaking the skins in a strong liquid. Then another strong liquid, made from the bark of trees, is used to make the skins tough. When the skins have been dried and smoothed and given a black or a tan color, they are ready to be made into shoes.



© Brown Bros.

Silkworms

This is a book about the things you need and how you get them. You do not need much silk cloth or silk clothing if you have cotton and woolen clothing. So we shall not try to learn a great deal about silk now. Yet silk is the most interesting cloth there is, and you ought to know how it is made. The other kinds of cloth that we have studied are made of plant fibers or of the hair of animals; but silk is made of a very, very thin fiber, like a spider's web,

that comes from the body of a tiny worm called the *silkworm!*

Silkworms are very fussy about their food, and make better silk when they are fed the leaves of a certain tree called the *mulberry* tree than when they are fed anything else. Picking the leaves of mulberry trees and feeding them to the little silkworms is slow work. In our country people are not willing to do such work; for it takes a long time to get even a little silk from the silkworms, and the pay is therefore very little. But in some other countries there are great numbers of poor people who cannot find anything else to do. Two such countries are China and Japan, far away across the Pacific Ocean. You already know where Japan is. See if you can find China, also. A great many silkworms are kept in those countries. When the

Photo from Brown Bros.

Silk cocoons

worms spin the fuzzy little *cocoons* in which they live, their keepers slowly unwind the tiny silk fiber and twist it into thread. This thread, called *raw silk*, is woven into soft, shiny silk cloth in factories. Some of these factories are in the countries where the silkworms live, and some of the finest silk cloth is made there. But there are also many large silk factories in the United States. Remember where the cotton and woolen mills are and see if you can guess in what part of our country the silk mills are.

Now Answer These Questions

1. In what two ways is the sheep useful to us?
2. In what part of our country are the most sheep raised? Why?
3. What is a *sheep herder?* A *shearer? Yarn?*
4. From what other countries do we import a great deal of wool and hides?
5. What is *leather?* A *tannery?*
6. How is silk made?
7. What has the mulberry tree to do with silk?
8. From what countries does most of our raw silk come?

15. HOW OUR CLOTHING IS MADE

First Do These Things

1. A needle is one of the oldest kinds of tools. Explain how a needle works.

2. Find out how a sewing machine works and what makes it go.

3. Make something with a needle and thread.

4. Find out where your overcoat was made. Find out where your shoes were made. Get your teacher to tell you where these places are on the picture of your country on page 46.

5. Copy on the blackboard the picture on page 46. Make a white cross to show where you live. Make

other crosses to show where your overcoat and shoes came from. Find out where other things that you have came from. For instance, this book was made in New York. Put on your picture a white cross for New York. Next to the cross write, My Geography. Write next to each cross the name of the things that came from that place. Keep doing this day after day. When the picture gets too crowded, start another.

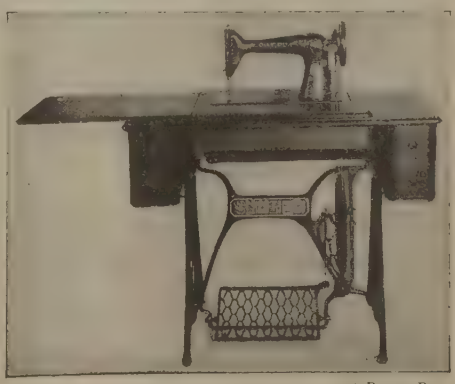
Then Read This

When the farmer has threshed his wheat or the miller has ground his flour, we cannot eat what he has made. For wheat kernels and flour are not good food until something more has been done to them. The work of a baker or of a cook is needed to make over the wheat or flour into a form that we can use.

When the cotton factory has turned out bolts of cotton cloth or hides have been turned into leather in the tannery, we cannot yet wear what has been made in the factory or the tannery. For you would look strange indeed if you came to school wrapped in a wide strip of cloth, like a statue, or in a big piece of leather like a truck driver's apron! Cloth is not yet ready to wear; it must be made into *garments*, such as coats and shirts and dresses, before it can be of much use to us as clothing. The

same is true of leather: we cannot wear it until it has been made into shoes.

The world was already very old when your grandmother's grandmother was a little girl. But even then people had not learned very well to divide the work of making things, and very often the same women spun thread and wove cloth and made garments. Nowadays different people do these things, because we have learned that if we divide our work so that each person does just what he knows how to do best, we get more done. If your mother has learned to sew nicely, she can make all the garments she pleases without wasting time learning how to spin or weave. And the man or woman who runs the loom in the mill can make the machinery make hundreds and hundreds of yards of the finest cloth and need not know how to sew a stitch!



© Brown Bros.

A sewing machine

Some garments are made by hand and others are made by machinery. Some women make beautiful clothes with simple tools like needles and scissors. Others use *sewing machines* in their homes. Still

others make clothing in factories where there are many sewing machines and many people to run them. Perhaps you never stopped to think how much work a sewing machine saves. There are old people still living who can remember the days when there were no sewing machines. When these people were young, every seam that had ever been sewed since the world began had been sewed slowly by hand. Then, suddenly, all that a woman had to do to sew a seam was to make the machine go with her feet and guide the cloth with her hands!

It is easier and quicker to make clothing in factories where many garments can be made at one time. So tailors in factories make hundreds of suits out of cloth that comes from the woolen mills. Some suits are made to fit tall men, and others to fit short men or stout men or thin men. Most of these factories are in a few big cities like New York where there are plenty of workmen. These *ready-made* suits, as they are called, are sold to storekeepers in every part of our country. When a short, stout man needs a new suit, he goes to a clothing store and buys a suit that was made to fit *any* short, stout man. In olden times he could not do this, for suits were made only for the people who were going to wear them.

Many women's clothes are made in much the same way. Tailors need the same kind of materials

Photo from Brown Bros.

Making clothing in a factory

and the same kind of skill to make women's coats and skirts that they need to make men's coats and trousers. So a great many women's suits are made in New York, too. So are dresses and hats and neckties and many other garments that men or women wear.

Stockings and underwear may be made of cotton or linen or wool or silk, so there are factories for making them wherever there are plenty of skillful workmen and it is easy to get cloth. Sometimes the factories of a whole city make chiefly one kind of garment. There is one city in our country where

the people make more shirts and collars than anything else.

Suppose you should wake up on a cold night and find your house on fire. One of the first things that you would reach for would be your shoes. Why? Because you would hurt your feet without them. Our shoes get harder wear than any other garment; if we did not have them, our feet would get harder wear than any other part of our bodies. So shoes are one of our most necessary kinds of clothing, and a great many factories in our country make nothing but shoes. Of course, these factories are in places where there are plenty of people to run the machinery and where it is easy to get leather. There are more shoe factories in Boston and the smaller cities near Boston than there are anywhere else in the United States. There are also many shoe factories in St. Louis. Find these cities again in the picture on page 53.

Some of the things that we need last much longer than others. We destroy *food* by eating it, just as we destroy coal by burning it. We also wear out clothes; but if we are careful of them they will last for years. And shelter and tools last even longer than clothing. Since clothing can be used so much longer than food, there is still work to be done on our clothes long after we have begun to use them. Can you tell your teacher what two things have to

Photo from Brown Bros.

Washing clothes in a laundry

Notice that the clothes are washed in big bags.

be done to most of our clothing every week? Who does these two things? Why are they necessary?

Now Answer These Questions

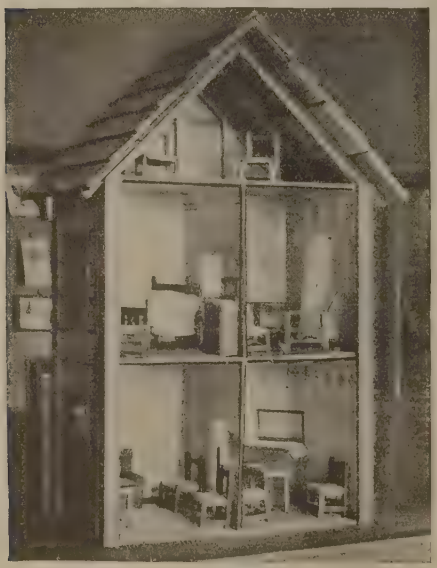
1. Many people have at some time worked to give us the food and clothing and shelter that we have. Here is a list of some of the persons who have helped to give us bread: 1, the wheat farmer; 2, the trainman; 3, the flour miller; 4, the trainman again; 5, the grocer; 6, the cook (or baker). Who are the people who have worked to give your father cotton shirts?
2. What are *ready-made* clothes?
3. In what two large cities are many shoes made?

16. DIFFERENT KINDS OF HOUSES

First Do These Things

1. If you have ever gone camping, tell the class about it.

2. At home or in your school workshop, make a bird house or a dog house or a doll's house.



From Bonser and Mossman's "Industrial Arts for Elementary Schools." By permission

Here is a doll house that was made by younger boys and girls than you.

3. Make a list of buildings of different kinds, and tell what each is for. Houses and barns and stores are three examples.

Then Read This

A long time ago there were men who lived in caves. They had only rough stone tools to work with, so they could not build themselves regular houses like ours. When it was cold, they built fires in front of their caves to keep warm. Except for the fires which warmed them, these caves were not much better than the dens of bears.

The people who lived in them must have been very uncomfortable, most of all the little children. There were many dangers, and only the boys and girls who knew best how to take care of themselves lived to grow up. In those days everybody *had* to know the sort of things that Boy and Girl Scouts learn nowadays. But even the cave people had many good times, and drew pictures on the walls of their cave homes. Here is a picture that some cave man or woman drew thousands of years ago.

From a drawing by J. F. Horrabin in H. G. Wells' "The Outline of History"

After a long, long time men made themselves better tools and learned to chip or carve stones and rocks and to place one row of stones on top of another to make a wall. In many countries in Asia and Europe most of the houses still have stone walls. In the United States many of our large buildings have stone walls, but most people live in wooden houses.

Wooden houses are easier to build than stone houses, but they are not so warm and they burn

down more easily. People live in wooden houses in countries where there are many trees and stone is scarce. In rocky countries where there is not much wood, people often live in stone houses.

There are some parts of the world where there is not enough stone or wood for the buildings that the people need. In such countries people often make *bricks* by baking a kind of soil called *clay*. A brick

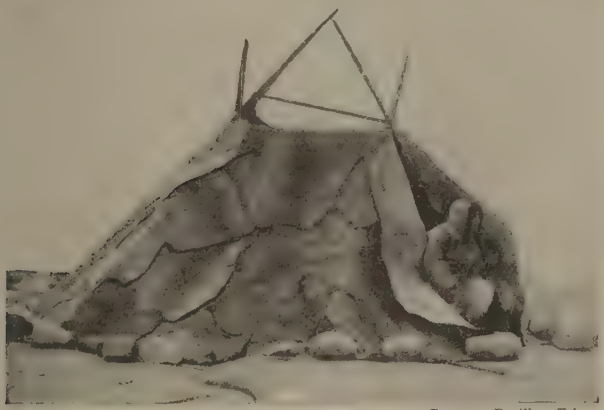
Courtesy Revillon Frères

A snow house of the kind sometimes used by Eskimos

house is as warm as a stone house, but it is cheaper and easier to build. So even where there is plenty of stone and wood, many people prefer to use bricks.

Wood, stone, and bricks are the chief materials that are used for the walls of houses in countries that have a temperate climate. You remember that many more people live in such countries than anywhere else; so most of the houses in the world are made of these three materials.

In Chapter 12 you read that the people of very cold or very warm lands dress differently from ourselves. In Chapter 2 you had already learned that the Eskimos eat meals that are not at all like ours. Their houses also are unlike ours. Since the Eskimos hunt and fish for a living, they must go where the hunting is good and there are plenty of fish.



Courtesy Revillon Frères

An Eskimo tent, used in the spring

For this reason it would not pay to build large houses of stone, even if they had good tools for cutting stone. So instead, they live in little huts of sod and earth; or they build huts of old logs which have floated down the rivers to the ocean and which the ocean waves have thrown up on the shore. There are even a few places where the Eskimos' houses are built of snow. They light and heat their homes in winter with oil which they make from the

Photo by the author

A. (See page 135.)

fat of seals, whales, walrus, or polar bears that they catch in or near the ocean. These strange houses are likely to be warmer in cold weather than well-built houses of wood or stone or brick in our own country.

In temperate countries also, and in some very warm countries, there are many people who do not

© Brown Bros.

B. (See page 135.)

have regular homes but who live first in one place and then in another. Such people are called *nomads*. There are countries that are not dry enough to be called deserts, but that are so dry that only a little grass can grow. Sheep herders in such lands are nomads. Each day they have to move their herds to new pastures. These nomads need a kind of shelter that can be moved easily. Can you think of

a kind of shelter that is moved very easily indeed? A tent, of course! Many nomads in dry countries of Asia and Africa live, the year round, in tents made of cloth or of the skins of animals. Many Eskimos also live in tents in the summer time.

In warm countries where there is a great deal of rain, people need shelter that will let in the fresh

Courtesy Strout Farm Agency

C. (See page 135.)

air but keep out the rain. Houses in such places have water-tight roofs and thin walls, and are often raised up from the ground on posts.

Our own country is so large that almost any kind of shelter that you can think of is to be found in it somewhere. In this chapter there are pictures of five

different kinds of houses. All these houses are in the United States.

A is a log cabin, such as the first settlers of our country built long ago when they had no machinery to saw trees up into boards.

Photo from Brown Bros.

D. (See page 136.)

B is an *adobe* house. Adobe is dried mud. Adobe houses, with earthen floors, are cool, and are sometimes built in parts of our country where the summers are very hot and dry. Why could not adobe houses be used in a wet climate?

C is a farmhouse. The farmer has room for his house and barn and garage, and a wide, deep yard.

D is a house in a small city. The family that lives here has a garage and a small yard, but the neighbors' houses are very near.

In the city, everyone wants, of course, to live near the place where he works. But so many people work in each large city that there is not room for each family to have its own house and yard. If each family *did*, the city would be so large that the people near its edges could not get to the places where they work each day. So in the large cities there are very few yards, and even those are small.

© *Brown Bros.*

E. (See page 137.)

In fact, there are so many people who must have homes close together that it is often necessary to build houses in layers, or *stories*, one on top of the other. People who live in the upper stories get there by climbing stairs or riding up in *elevators*. In a great city like New York it is common for thirty families, and often many more,

to live in a single building, called an *apartment house.* E is such an apartment house. The rooms that one family lives in are called an *apartment.* Other families live above and below and on both sides. In many apartment houses the only windows are at the front and back. The front windows look out on a street that seems narrow because the houses on both sides are so high; the back windows face the rear of another house.

Now Answer These Questions

1. What are the three materials which are used most often in building houses in the United States?
2. When is stone used more often than wood in building houses? When is wood used more often than stone?
3. What are the winter houses of the Eskimos made of? What do many Eskimos live in in the summer time?
4. What were the *cave men?* What are *nomads?*
5. What is *adobe?* What is *clay?*
6. What is an *apartment house?* What are the *stories* of a building?
7. Would you prefer to live in a country house or in a city house? Why?

17. OUR FORESTS AND THEIR USES

First Do These Things

1. Ask your teacher to tell you the story of Columbus.

Photo from Brown Bros.

Cutting down a big tree in the West

2. Ask her also to tell you the story of the Pilgrims.

3. If you live near a sawmill or a planing mill, try to find out how the machinery cuts the logs or

planes the boards. Perhaps your father will take you to see the men at work. If he does, he will tell you to keep close beside him and not to touch the machinery. Why? If there is no sawmill or planing mill near your home, perhaps you can visit a lumber yard and see how boards are kept piled before they are used.

4. On these two pages there are pictures that show

© Brown Bros.

Hauling logs by truck to a sawmill

you how big trees are cut down and how some of the logs are sent to the mills. Study these pictures and tell just what happens to each tree that is cut down.

5. Drive a nail through a piece of oak and through

a piece of pine to see the difference between hard and soft wood.

Then Read This

The first people who sailed to our country from the Old World found great forests of stately trees wherever they went.

Along the northern part of our Atlantic coast they

Published by permission Yale University Press from "Columbus," one of the Chronicles of America Motion Pictures. Copyright.

The landing of Columbus

found *evergreen* trees with straight trunks and slender green needles instead of leaves.

Far to the south is the long, narrow tongue of land, or *peninsula*, of Florida. Near the tip of this peninsula, and on the near-by islands, it is warm

enough for coconut palms to grow. The first trees that Columbus saw when he landed on a little island east of Florida were palms.

Not quite so far south, our early visitors found the Southern pine, with very long needles and bark all divided up by little ridges like the shell of a turtle. Along the middle part of our coast they found great forests of hardwood trees that lose their leaves in the fall and get new leaves in the spring.

There were trees everywhere. When the early settlers climbed hills to look out over the new land that they had come to, they saw only the tops of trees stretching out into the distance until trees and sky seemed to meet. These settlers knew that they would have to raise food crops in the fields to keep from starving; but there were no fields to raise them in — only wide, dense forests. So they *made* fields by cutting down all the trees in parts of the forest and digging out the stumps. A few of the trees that they cut down they used for log cabins and forts. The rest they wasted.

Then, very slowly, people began to move away from the Atlantic coast and to go west to places where there was land enough for everybody. Along the northern edge of our country they found dense forests of pine trees. South of the pine forests, in the middle part of our country where the corn belt is, there were great stretches of level, grassy land be-

tween the patches of forest. This was fortunate; for settlers did not have to clear land for crops, yet there were all the trees they needed for cabins and firewood.

Soon after the first log cabins were built, *sawmills* were brought across the Atlantic Ocean in ships, and

A sawmill

the settlers sawed the trunks of trees into boards instead of building houses of round logs. In the sawmills were round saws with sharp teeth that cut through the logs lengthwise and divided them into flat boards. Flat boards fit together better than round logs, and it is easier to make walls and floors and roofs with them.

The people who went west and settled on new land were called *pioneers*. At first the pioneers in the West lived in log cabins. Later they carried long, two-handled *whipsaws* with them and made rough boards.

Trees that are sawed into boards and beams in a sawmill become *lumber*. The lumber that we buy

Photo from Brown Bros.

A planing mill

to build a house with is first cut into boards in a *sawmill* and then smoothed, or *planed*, by machinery in a *planing mill*.

For a long time most of our lumber came from a part of our country not far from the home of the Pilgrims. Trees were cut down in the woods in the winter and the logs were allowed to float down the

rivers in the spring to the sawmills in towns near the ocean.

Many years later so many people had moved west that villages grew into towns and towns grew into

Photo from Brown Bros.

Snow-covered mountains in the West

cities in the central part of the United States. The houses in these towns and cities were built chiefly of lumber from the big pine forests north of them.

While these cities were being built, pioneers kept on moving west. About halfway between the Atlantic and the Pacific Oceans they found that it did not rain so often as it did in the East. Trees got scarcer and scarcer and there was level, grassy land

almost everywhere. And they found places where it was too dry even for grass. Then the pioneers had to cross wide deserts and high mountains. You already know what a desert is, but if you live where the land is level you may not know what a *moun-*

Photo by Alaskan Engineering Commission

Clouds strike against the tops and sides of high mountains.

tain is. A mountain is a very high hill. Some mountains in the western part of our country are many times taller than the tallest building in the world! On the tops of high mountains it is almost always cold: so high mountains are covered with snow the year round.

In the part of our country that is near the Pacific Ocean, winds blow clouds from over the ocean

against the sides of the mountains. Then rain falls on the mountains. So much rain falls on these mountains that there are very many trees and they grow to be very large. Where there are many big trees, of course, it is easy to get lumber. Many settlers have moved to our western coast and have used part of this lumber to build large cities.

While the western part of our country was being settled, other people were building towns and cities in the part near the big arm of the Atlantic Ocean which is called the Gulf of Mexico. (A *gulf* is a part of an ocean that reaches a long way into a continent and has land part way around it.) Along our Gulf coast there is a wide strip of country where there are great pine forests. Much of the lumber from the northern part of our Atlantic coast has already been used. Not much lumber is left in the north central part of the United States, either. So we now get most of our lumber from the West and the South.

We are using up our lumber in other ways besides building houses out of it. In the South, we are taking the sap out of the pine trees to make *turpentine*, which is used in making paint. In parts of the North, we use a great many trees to make paper. The wood is ground into a fine pulp and made over into thin sheets of paper in *paper mills*. There are a great many paper mills in the forests

where only small trees are left, for good paper can be made out of smaller trees than can be used for lumber.

Photo from Brown Bros.

Grinding paper pulp

We are cutting down our forests four times as fast as they are growing. Many thousands of trees are burned up every year by fires that careless people leave burning. Should we not do everything that we can to keep our forests from being destroyed?

Now Answer These Questions

1. Where are our chief hardwood forests?
2. From what two parts of the United States does most of our lumber now come?

3. What is a *sawmill?* A *planing mill?* *Lumber?* *Turpentine?*

4. What is a *pioneer?*

5. What is a *gulf?* A *peninsula?* A *mountain?*

Photo from Brown Bros.

A forest fire

6. What things would you have to get along without if there were no more lumber?

18. STONE THAT WE QUARRY AND STONE THAT WE MAKE

First Do These Things

1. If you can, watch bricklayers at work. Notice how the bricks are placed to make walls strong.

2. Make as big a list as you can of things that are made of stone; of brick; of homemade stone, such as *concrete*.

3. Think of several of the largest buildings near where you live, and tell what the walls of each are made of.

4. Learn to know granite, marble, limestone, and sandstone when you see them.

5. There are several important *building materials* that we shall not have room to tell about in this book. *Glass* is one of them. This lesson tells you only about stone that we find or make. What other materials is your house made of that you have not read about in this book?

Then Read This

In the chapters of this book that you have already studied, you have learned how very helpful plants and animals are to Man. (When we wish to speak of all the men, women, and children in the world

Photo from Brown Bros.

A marble quarry

and think of them as one big family, we say just "Man.") You have learned that we eat plant and animal food; that we wear clothing made of plant and animal materials; and that we even live in plant houses — for wood comes from trees and trees are nothing but large plants.

In later chapters you will learn how plants and animals help us in still other ways; for example, how we can make wood do work for us by burning it, and how animals carry things for us from one place to another. But in the rest of this book we shall pay more attention to the use that we make of materials that we get from the earth.

(See page 152.)

You have already learned that Man's first houses were of stone; for caves, after all, are only hollow places in rocks. Man's next step in making himself a better home was to pile up loose rocks that he found lying on the ground. And then someone had the great idea of cutting blocks of stone right out of the solid rock. At first this must have been very hard, slow work. Perhaps men did it by prying open the cracks, or *seams*, in rocks where the frost had already begun the work for them. But we know that very long ago men knew how to *quarry* rock, or to dig it out of the earth in open pits, almost as well as they can do it to-day. They built great buildings of huge stones so strongly that many of them are still standing; so also are the broken parts, or *ruins*, of many more. On pages 151 and 153 are pictures of some old and famous ruins.

At first very large stones were used. These were cut very carefully and put together without mortar. Many hundreds of years later *masons*, or men who make stone walls, learned that they could use mortar to fill up the cracks between the stones and make walls still more solid. Lime is made of burnt and powdered limestone. Mortar is made of lime mixed with sand and water. Mortar is soft and sticky when it is fresh, and flows into all the little hollow places between the stones. When it dries it gets almost as hard as the stones themselves.

(See page 152.)

This famous ruin is in Greece (page 164).

To this day, large buildings that are used by many people, such as courthouses and churches and schools, are often made of stone. Stone is a stronger and safer material than wood, and for this reason it is better for large *public buildings*.

There are four kinds of stone that we quarry in our country which are more important than other kinds. The northern part of the United States along the Atlantic Ocean, near the place where the Pilgrims landed, is called New England. In New England there are many quarries where we get granite and many others where we get marble. *Granite*

is a very hard kind of rock. The outside walls of many of our best public buildings, like that in the picture on page 156, are made of it. *Marble* is not quite so hard as granite: it can be cut into thin, wide pieces, or *slabs*, and it can be made very smooth.

Photo from Brown Bros.

A public building with walls of stone

Marble is often used to make the inside of buildings beautiful. On page 155 is a picture of a marble stairway.

Two other kinds of stone are quarried in many parts of our country, and are so common that they are cheaper than granite or marble. These are *limestone* and *sandstone*. Many public buildings, and

the cellar walls of houses, are made of these kinds of stone.

In some countries there is no stone to use for building. So a long time ago people learned to make bricks to use instead. There are some brick buildings older than those you see on pages 151 and 153. These people who did not have any stone made bricks out of clay. They did this by pressing the clay into pieces of the right shape and then letting them dry in the hot sun until they became hard. These sun-dried bricks were something like adobe (page 135).

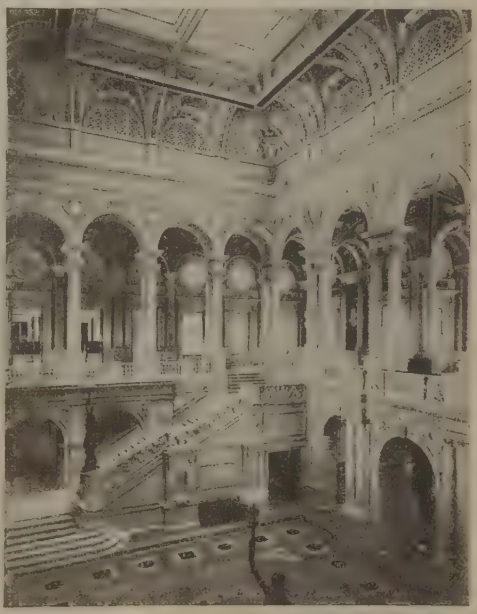


Photo by Brown Bros.

A marble stairway

Later, men learned that they could make better bricks and make them much faster by baking them in ovens called *kilns*. (Say this word just like "kills"; pay no attention to the *n*.) We make red bricks out of red clay, yellow bricks out of yellow clay, and white bricks out of white clay; but we can also change

A public building with walls of granite

the color of the bricks by mixing other materials with the clay before it is baked.

We can use bricks in making almost any kind of building where stone could be used, and bricks are easier to put together. Men called *bricklayers* make walls of them by sticking them together with mortar, just as masons use mortar in making stone walls.

Large stones make stronger walls than bricks. But it is easier to lay bricks than to pile up heavy stones. So builders have learned to use another material that is as strong as stone but that can be

used even more easily than bricks. That material is *concrete.*

Cement is used in making concrete. Cement is made of limestone and other kinds of stone ground into very fine powder. Just the right amounts of cement and crushed stone and water are put into a *concrete mixer.* The mixer turns them round and round in a big steel barrel or tank until they are well mixed.

Photo from Brown Bros.

A brick kiln

The concrete is then ready to be poured into wooden frames that have just the shape and thickness of the floor or wall that is to be made. When the concrete has *set,* or become hard, the workmen take away the wooden mold and leave the concrete standing alone.

If it is necessary for a concrete floor or wall or beam to be made even stronger than stone, steel rods are put into the hollow molds first and the concrete is poured in around them. This steel

Photo from Brown Bros.

A concrete mixer

Notice the bags of cement on top.

core, or inside, helps to keep the concrete from breaking.

You have already learned (in Chapter 16) that in large cities houses often have many stories, one above another, where people live. City stores, where things are sold, and factories, where people make things, often have many stories, too. So do *office buildings*, where doctors and lawyers and clerks work. The very tallest buildings sometimes have more than thirty stories, with a row of windows for every story, as you see in the picture.

Such buildings are called *skyscrapers*. Can you

guess why? The top stories press down on the bottom stories very hard and would crush them if the beams that hold them up were not very, very strong.

Here are two pictures of the tallest office building in the world — one taken while it was being built, and the other showing it as it looks to-day.

So the beams in skyscrapers are made of steel. How we get our steel you will learn in Chapter 22. Here is a picture of a skyscraper that is being built. Smooth slabs of *tile*, which are made something like brick, are put on the outside of these beams. The

beams will not show at all when the building is finished.

Now Answer These Questions

1. What is meant by *quarrying* rock?
2. What are *ruins?*
3. What two important kinds of stone are quarried in New England? Where is New England?
4. What is meant by a *public building?*
5. What two kinds of stone are quarried in many parts of our country?
6. What is a *kiln?*
7. How is *mortar* used?
8. How is *concrete* made and used? What do we mean when we say that concrete has *set?*
9. What is a *skyscraper?*

19. HOW WE FURNISH OUR HOUSES

First Do These Things

1. Let the girls in the class furnish a doll house. Think of the most important furniture that is used in a living room; in a bedroom; in a dining room; in a kitchen. Let one little girl bring dolls' dishes (if any little girl has them). Let another bring dolls' beds, and so on. If there are such things as dolls' tables and chairs which no little girl has, try to make them. Perhaps the boys in the class will help you.

2. Let the boys furnish a real play cabin or shanty. Make benches and tables out of packing boxes if you can get them.

From Bonser and Mossman's "Industrial Arts for Elementary Schools." By permission

Here is furniture that was made by school children out of packing boxes.

3. Let the whole class help to make the schoolroom furniture better. If there are pencil marks on any of the desks, erase them. If there are ink

marks, take them off with sandpaper. Or perhaps you can help to mend something that is broken.

4. Get your teacher to tell you the story of the Swiss Family Robinson.

Then Read This

Suppose that you were shipwrecked, like the Swiss Family Robinson, and had to live in a house that you built high up among the branches of a big tree.

Photo by Ewing Galloway, N. Y.

You would have to make your own furniture. What would you make first? A hatrack? A book case? No, of course not! A chair? A bed? Perhaps. But if you were wise, the first thing you would make would be some dish or jug that would hold water. Even Pussy drinks her milk out of a saucer, and one of the first things a civilized man learns to do is to make *pottery.*

Pottery is the name we give all dishes and jugs and

bowls and jars that are made of *china* or of the coarser material that we call *crockery*. Everyone who eats cooked food or who keeps things to eat and drink in his house needs pottery. Pottery is made of many different kinds of clay. (Look on pages 155 and 159 again to find other things that are made of clay.)

Clay is a smooth, sticky kind of mud that is found in many places in almost every country in the world. Clay can be molded into the form of any dish we want. If nothing more were done to it, it would not be strong enough to be moved around, and it would crumble and fall apart. But if we *bake* clay it gets hard, like stone or bricks or tile.

People have been making dishes of clay ever since they lived in caves and used stone hatchets. They have been making them so long that two thousand years ago they had already learned to make very beautiful jars and vases. Here is a picture of a vase that was made in Greece more than two

thousand years ago. Greece is a country on a peninsula near the eastern end of the Mediterranean Sea. The Mediterranean Sea is between Europe and Africa. Look at page 140 again to see what a peninsula is. Now look on your globe and find what continent Greece is in.

Beautiful pottery is still made in many parts of the world. Our best dishes, however, are made in three countries in Europe — England, France, and Germany; a country in Asia — Japan; and a country in North America — you have already guessed it, the United States!

The *potter* who makes pottery makes dishes round by pressing the soft clay into shape while he turns it on a *potter's wheel.* Dishes that have handles are made without the handles first; the handles are stuck on afterward. If the clay were baked just as it comes from the potter's wheel, it would not hold water. There are tiny little holes in clay. These are too small for you to see, but water finds them easily and flows through them. So potters put a thin coating of smooth, glass-like *glaze* over dishes before they bake them. This makes them water-tight. Run your finger over a glazed china plate and an unglazed flowerpot, and feel the difference.

Almost as soon as Man learned to make pottery, he began to make wooden furniture. He got tired

of sitting cross-legged on the floor, and made chairs. He gave up his bed of straw on the floor and built a raised bedstead. And as soon as he had chairs to sit in, he had to have tables to eat at and to work at while he was sitting.

© Underwood and Underwood

Dipping plates in glaze

Remember how many people there are in a single city of our country (page 104), and think how many chairs all these people must need to sit in! Wooden furniture, such as chairs and tables and dressers and sideboards, is made in many cities of the United States where lumber is easy to get. Sometimes the

people of a city learn to make furniture so well that they keep right on making it long after all the near-by trees have been cut down. Then they have lumber brought to them from far-away places on ships or railroad cars. Often a whole factory makes just one kind of furniture, such as babies' cribs. Other factories make furniture of steel. What very common kind of funiture is made sometimes of wood but oftener of steel?

A room in Japan
In Japan, pictures are often painted right on the wall

Perhaps you will be surprised to learn that styles in furniture are as different as styles in clothing. In Japan very little furniture is made to keep people comfortable, but everyone tries to make the rooms of his house pretty. So there are hardly any chairs or tables or what you would call good beds; but there are many pictures.

Nomads, like the Eskimos and the sheep herders in dry parts of Asia, have hardly any furniture except rugs. The Eskimos' rugs are, of course, just the furry skins of animals. The sheep herder in

Asia, and his family, weave beautiful rugs of wool that he gets from his sheep. He does it by hand, and it sometimes takes him years to weave a single rug. Things that it takes a lot of time and work to make are expensive; for a person who spends a

Photo from Brown Bros.

Weaving Oriental rugs

The part of the rug that has been woven hangs below.

year weaving a rug must sell the rug for enough money to buy him everything that he needs for a year. So Oriental rugs are expensive. We call rugs from Asia *Oriental* rugs because Asia is a part of the Orient, or the East. We make beautiful rugs in our own country, too. But we make them much more cheaply by machinery in factories, in big cities like Philadelphia where there are many people who earn their living by making things to sell to other people.

Ever since the cave man or woman made the picture on his wall which you saw on page 129, people have wanted to make their homes beautiful. The most beautiful house in the world would be a gloomy place to live in if there were no furniture, or ugly furniture, in it. Good-looking furniture is so important that all civilized people want *some* things in their houses that are *just* pretty and that may not be useful at all. Such things are paintings and vases and sometimes candlesticks. Even useful furniture must be good to look at, or most people do not want it. Name all the kinds of furniture you can that are *just* pretty. Name all you can that are both pretty and useful, like clocks and pianos. Name all you can that are just useful, like washtubs.

Now Answer These Questions

1. What is *pottery?* A *potter's wheel?*
2. Why is it necessary to put a glaze on pottery?
3. In what countries are the best dishes made?
4. Why have the people in some cities kept on making furniture after it was necessary to bring lumber from a long distance?
5. What can you tell about furniture in Japan?
6. What is an *Oriental* rug? Why is it expensive?
7. What kinds of furniture do you have in your schoolroom that are not useful, but pretty?

20. HOW WE GET OUR FUEL

First Do These Things

1. If there is a furnace in your house, find out whether you have hot air, hot water, or steam heat. Get your father to tell you how the furnace works, and to show you how the flues or pipes, if there are any, get to the radiators. If you have a stove or fireplace instead of a furnace, find out why you do not need a furnace.

2. Tell what fuel is used in your house for cooking. Explain why your family uses this kind of fuel.

3. Find out how Boy Scouts build fires.

4. Decide what you would do if your home or your schoolhouse should catch fire.

Then Read This

You have already learned that shelter and clothing are both useful to us because they keep us dry and warm. Any well-built house will keep us dry; but not even a king's palace could keep us warm on a cold day without a fire to heat it. In this chapter you will learn about the things that Man burns to make fires, and how he uses fire to keep himself warm. In the next chapter you will learn about other ways in which he uses fire.

When the first men learned to use fire, they made the greatest discovery in the world. Without fire, men could not live where it was cold, and they could not sleep for fear of wild animals. With fire, they could make their homes warm in the coldest weather, and they could frighten away lions and tigers and bears.

Men had seen fire even before they learned to use it. For lightning now and then sets a forest on fire, and mountains called *volcanoes* sometimes spout forth fire and smoke and very hot melted stone called *lava*. There is one live volcano in our own country, and there are many dead ones, which have stopped smoking. There are many more in other countries that belong to us. When Man learned to add wood to a fire that Nature had set and in this way kept it going, he made Fire his slave. Fire is a dangerous slave and sometimes hurts his master. But without fire Man could never be anything but a savage.

The first fires were *bonfires*, and were made with sticks that could be picked up in the forest. But bonfires are hard to manage, because wind makes them spread and rain puts them out. So Man learned to take his bonfire into his house and to put it on a place called a *hearth*, or a *fireplace*, where it would keep him warm but could not do him any harm. At first people let the smoke go up through a hole in the roof. This kept everything in

© Publishers Photo Service

This picture was taken near the top of a volcano. Most volcanoes do not send forth smoke like this all the time but burst out, or *erupt*, when people least expect them to do so.

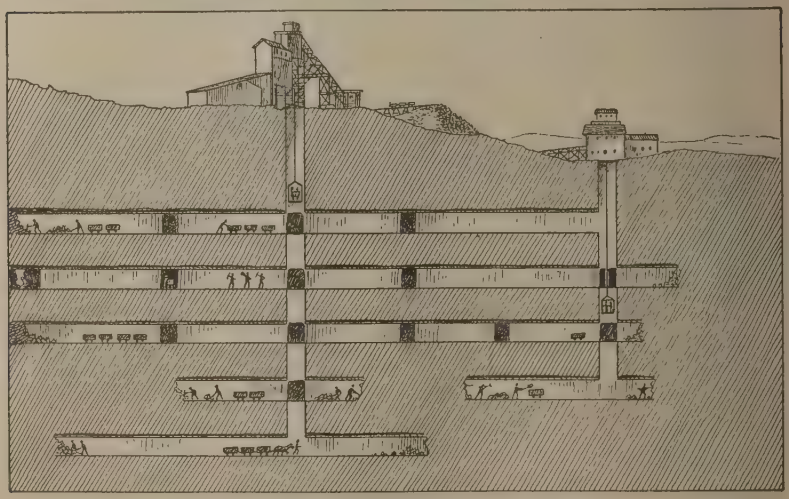
the house sooty, and the smoke was bad for their eyes. Then they invented *chimneys*, and let the smoke go up the chimney instead of into the room.

For thousands of years Man's chief *fuel* (or material for burning) was wood. Even to-day, wood is burned in stoves and open fireplaces, and is the only fuel in places where other kinds of fuel are hard to get. On farms where there are patches of woods, farmers often cut down trees on their *wood lots* to use as fuel.

In many countries a much more important fuel is

coal. Men have been acquainted with coal for many hundreds of years; but they have used coal as their chief fuel for not much more than one hundred years, and in the long story of the world a hundred years is a very short time indeed.

You all know what coal looks like. It is a black mineral (page 84) that burns. Coal comes in



This picture shows you how coal is mined.

layers in the earth. Men called *miners* dig it out of the earth. First they dig a hole, or *shaft*, like a well deep down into the earth. Elevators carry them up and down the shaft. Then they dig other holes, or *tunnels*, sideways into the earth from the shaft. On the floors of these long tunnels are narrow tracks which lead to the *seams*, or layers, of coal. The miners loosen the coal in the seams with picks

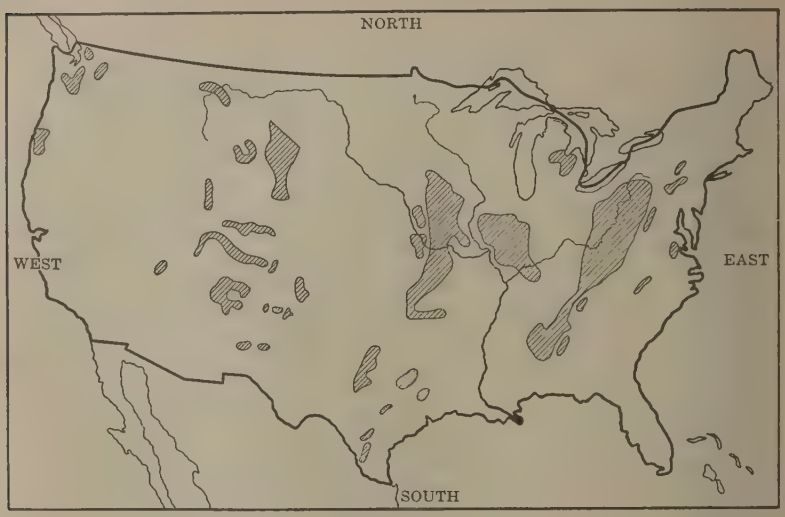
or break it up by making explosions in holes that they bore, or *drill*, in the coal. Then they load the pieces of coal into steel cars and push the cars along the tracks to the shaft. Sometimes they hitch several cars together and have mules or engines haul

Photo from Brown Bros.

An electric engine is hauling these cars of coal through a tunnel to the shaft.

them. When the coal reaches the shaft, it is hauled up in the elevators and dumped out on platforms. Here it is sorted and the useless rock is thrown away. Next the coal is broken up, or crushed, by machinery into pieces of just the size that people want to buy. Then it is carried in railroad cars or ships to the places where it is needed.

Coal is found in many countries, and in many parts of our own country. Here is another picture of our country that shows the parts where coal is mined. Little pictures like this and the pictures on



pages 48 and 53 and 105, which show the shape of countries and tell where places are in those countries, are called *maps*. The picture of the land and water of the earth that you see on your school globe is really a round *map* of the world.

Some of the coal that is mined in these places is burned in stoves or furnaces to keep houses warm. Much more is used in other ways that we shall read about in the next chapter. When we burn coal in furnaces to keep our houses warm, we sometimes let the furnace heat the air and then we let the warm

air go through large tin pipes, or *flues*, to all our rooms. When we have to heat large houses or other buildings, it is easier to let the fire heat water in small iron pipes and to let the hot water go through *radiators* which warm the air in the rooms. Sometimes we make the water so hot that it turns to steam, and we let steam instead of water go through the pipes and radiators.

People need fires not only to heat their houses, but also to cook with. In most cities *gas* is made out of coal and stored in big tanks that are higher than houses. Then the gas flows through pipes in the streets to smaller pipes in the houses. These pipes lead to *gas stoves* on which people cook their food. In some houses they also lead to *gas jets* where gas is burned to light the rooms at night. People sometimes also burn gas in little stoves to keep their rooms warm. In some parts of our country people do not have to make gas at all, but take *natural gas* out of

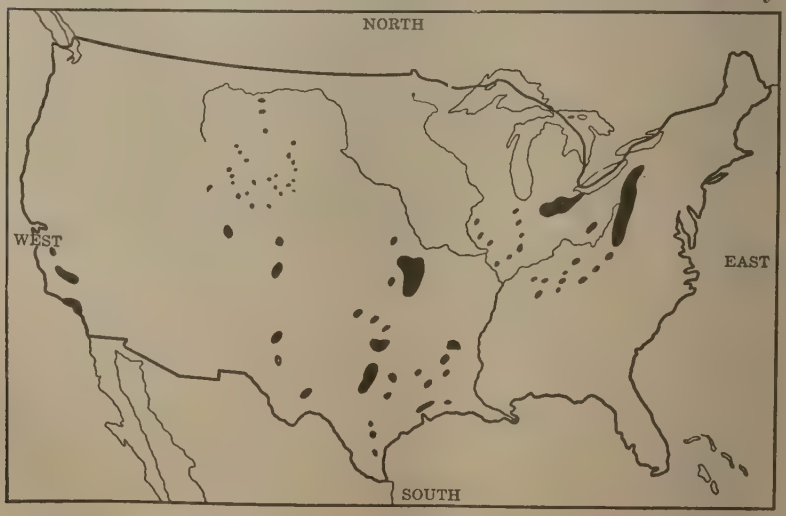
Photo from Brown Bros.

Gas is stored in big tanks like these.

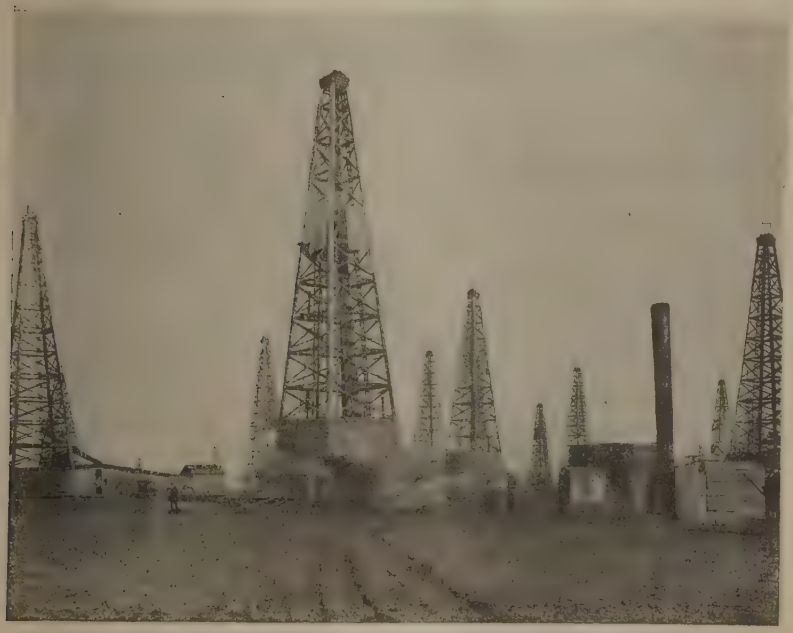
the earth. You cannot see gas, but you can smell it. Gas kills people if they breathe enough of it. What, then, ought you to do if you smell gas in a room?

If you live in the country where you cannot have gas, perhaps your mother uses a kerosene stove for cooking. Perhaps your father also lights another kind of kerosene stove to warm the living room on a cold morning. Kerosene is made from a kind of oil that comes out of the earth, called *petroleum*. So is the gasoline that is used to make automobiles go. You will read about gasoline in the next chapter.

Petroleum is found in rock far down in the earth. Here is a map that shows the parts of our country where most of our oil comes from. Men who study



rocks can tell where petroleum, or just *oil*, as we often call it, is likely to be found. Then men drill very deep wells to get it. Sometimes oil is found at the bottom of a well, and the men who have drilled it get so much oil out of it that they become rich.



There is a deep oil well under each of these derricks.

But often there is no oil in the well and then all the money that it has cost is wasted. When oil is *struck*, it is pumped out of the well or *gushes* out itself. Then it is sent for many miles through long pipes to factories called *refineries*. Here it is made pure. Some of it is made ready to burn as fuel oil; more of it is made over into kerosene and gasoline and other things.

Now Answer These Questions

1. What is a *volcano?* *Lava?*
2. What is the difference between a *shaft* and a *tunnel?*
3. What is a *radiator?* A *flue?*
4. What is *petroleum?* What else that you have read about, besides petroleum, is sent to a *refinery?*
5. What kinds of fuel have you read about in this chapter? How is each used?

21. HOW MAN MAKES NATURE WORK FOR HIM

First Do These Things

1. If you have a windmill, find how it works. Perhaps your father will help you to make a toy windmill that will turn with the wind.

2. Put a cork in an empty bottle. Put the bottle in a kettle of cold water and heat the water. Leave a lid on the kettle until you hear a pop. Then tell what has happened. The fire under the water has *done work*. What work? A steam engine works in much the same way.

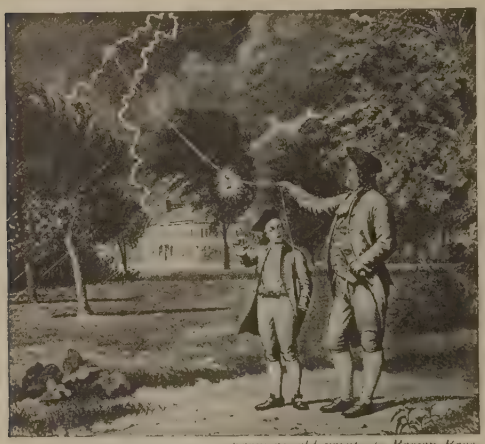
An old-fashioned windmill

3. On your sand table, show how a dam helps a miller to make a stream do his work.

4. Have your teacher tell you the story of Benjamin Franklin and his kite.

Then Read This

In Chapter 4 you read that Man has been busy for thousands of years learning new ways to save himself work. Animals and Fire and Falling Water and Wind are the four slaves that Man has forced to do the hardest of his work.

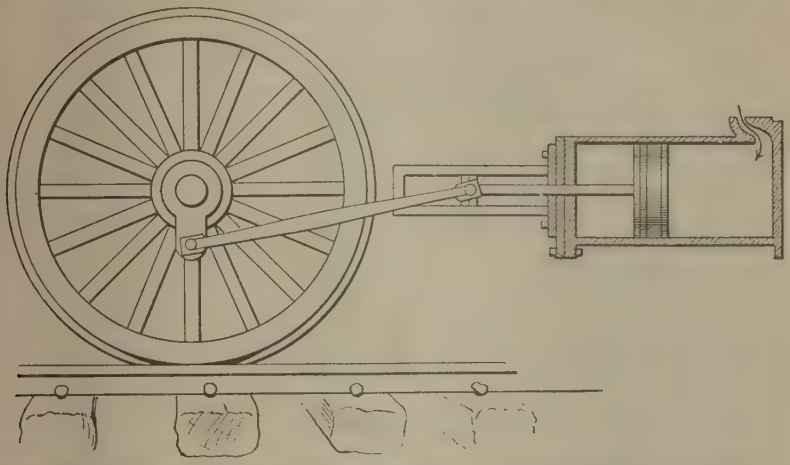


Benjamin Franklin and his kite

Carrying people and things from one place to another is the most important work that Man has taught animals to do for him. We shall learn more about that kind of work in Chapter 23. For a long, long time farmers have made animals help them plow. Name ways in which men have taught dogs to help them.

In the last chapter you learned how useful fire has been to Man in keeping him warm. But making us comfortable is not the only way in which fire helps us. Fire can be made to heat water, and water when it gets hot behaves very strangely. When water gets so hot that it boils, it becomes *steam*. You cannot see steam, any more than you

can see air. When water turns into steam, it needs more room than it had before. If you keep water in a *boiler* and then heat it until it becomes steam, it pushes outward very hard, like the hot air that pushed the stopper out of the bottle. If you let



This drawing shows you how the steam in a steam engine pushes against a big steel stopper and makes it turn a wheel.

the steam hit a big steel stopper at the mouth of the boiler just as the hot air hit the cork at the mouth of the bottle, it pushes it out. You can make the other end of the stopper turn wheels and move machinery. You then have a *steam engine.*

For a great many years, steam engines have done a great deal of the work of the world. But you cannot have steam unless you heat water. You cannot heat water unless you have a fire. And you cannot have a fire unless you have fuel. So when

you make a steam engine work for you, you are really putting fuel to work. Coal is our commonest fuel. So coal does a very large part of our work.

When your fathers and mothers were little boys and girls, not very much gasoline was made or used. People used it in gasoline cook stoves, which were dangerous; and they used it to take spots out of clothing, and that was dangerous, too. Farmers had just learned to use it in noisy engines that sputtered and snorted and pumped water and sawed wood when they were not out of order; but often they *did* get out of order. At last these gasoline engines were made better, so that they worked well most of the time. Then people began to use them to make automobiles go. You will learn more about automobiles in Chapter 24. There are a great many automobiles now, and we need a great deal of gasoline to make them go. So petroleum, from which gasoline is made, has become a very important fuel.

Photo from Brown Bros.
Here the drivers of automobiles buy their gasoline.

In Chapter 4 you learned how millers used to make falling water work for them. Falling water can be made to do a great many kinds of work besides grinding grain. Have you ever tried to hold back the water in an open faucet by placing your hand against it? If you live in the country, perhaps you have seen water wash away the bank of a stream, or even carry away a bridge. If you live in a city, perhaps you have seen firemen break a window in a burning building by turning a hose on it. So you know that moving water is very strong.

Photo from Brown Bros.

Niagara Falls

In many places in almost every country there are *waterfalls*, where a little stream or a big river falls over a steep rock. Here is a picture of Niagara Falls. At Niagara Falls a great river between our country and Canada falls over the edge of steep

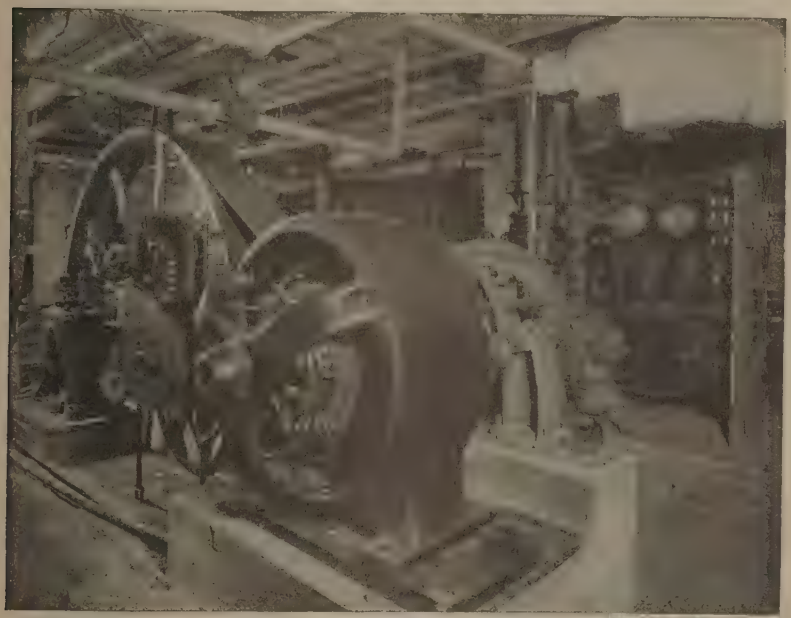
rocks farther than a stone would fall if you threw it from the top of a church steeple to the ground. This is one of the largest and most beautiful waterfalls in the world. There are many other smaller waterfalls in our own country.

Men have *harnessed* a part of Niagara Falls and put it to work. Perhaps you wonder how people can harness a waterfall. There are two ways. A water wheel can be placed under a small waterfall. The falling water turns the wheel and the wheel turns machinery. Or men can make *electricity* out of the force of the falling water. The second way is much commoner than the first way.

Electricity is a very wonderful kind of force. Men have not known how to use it very long. Of course there has always been lightning, but people did not know that lightning and electricity were the same thing until Benjamin Franklin flew his kite. (Your teacher told you about Franklin, you remember.) Let us see how we make electricity and how we use it.

When men turn the force of a waterfall into electricity, they let a narrow stream of water hit a water wheel in a *power house*. The water wheel is connected with a big, whirling machine called a *dynamo*. It makes the inside of the dynamo whirl around very fast, while the outside of the dynamo stands still. Most of you have played with a horseshoe magnet, that picks up needles and nails when

you hold them close to it. There are very large magnets in a dynamo. There are also many, many wires in the dynamo, as you see in the picture.



A dynamo

See if you can find the inner part that whirls around inside the outer part.

When you whirl a set, or *coil*, of wires inside a magnet, electricity is made. If the dynamo is very small and you turn the coil slowly and touch wires leading from the dynamo, you get a shock that makes you jump. If you should touch the wires leading from a large dynamo, the shock would kill you.

We can carry electricity to places many miles from

the power house where it was made. We hitch a long wire to the dynamo, and stretch the wire between the tops of poles so that its force will not run down into the earth. The other end of the

Photo from Brown Bros.

A power plant where falling water makes the dynamos go round

wire is often in another city so far away that you could not see it from the power house.

When the electricity has been carried along a wire to a factory where we want it to turn the machinery, we lead the wire to another machine just like a dynamo (but this time we call it a *motor*) and hitch it to the outer part. That makes the inside coil of the motor whirl around very fast. If we hitch machinery to the inside coil, it will turn too, and

do work for us. In this way we can make a waterfall run machinery many miles away.

We can make electricity do many things besides turning the wheels of machinery. One of these things that we make electricity do is to light our houses. You already know that electricity runs on wires. Copper wires let electricity pass along very easily. Other kinds of wire, like the little black wires in an electric light bulb, do not let the electricity pass so easily. When it is hard for electricity to get through a wire, the wire becomes hot. If it gets hot enough it shines brightly and lights our houses at night.

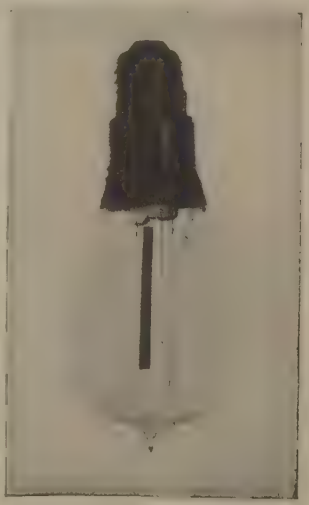


Photo from Brown Bros.

Since electricity can be made to heat things that it cannot pass through easily, we can make it cook our food and heat our houses. But these are very wasteful ways to use electricity. So people do not cook much with electricity or heat their houses with it except near a large waterfall where electricity is cheap.

Now Answer These Questions

1. On page 180 you read about the four slaves that Man has forced to work for him. One of these

slaves was Wind. Can you tell how Man has put Wind to work?

2. What makes a steam engine go?

3. Why has petroleum become a very important kind of fuel?

4. How can we *harness* a waterfall so as to make it work for us?

5. What is a *power house?* A *dynamo?* A *motor?*

6. In what other ways do we use electricity besides those told about on pages 186 and 187?

22. FROM STONE TO STEEL

First Do These Things

1. Ask your teacher to tell you the story of Robinson Crusoe. Crusoe got along very well on his island for two reasons: it was warm on his island the year round, and he got many useful tools and weapons from the wreck. Try to think what you would do if you were shipwrecked on a *cold* island and all the ship's tools were lost.

2. Make a list of things you have seen that are made of copper; of bronze (if you know of any); of brass.

3. Everyone who works uses tools. Make a list of all the tools you can think of that are used by a carpenter; a plumber; a gardener; a cook; a clerk; a dressmaker; a doctor; a teacher. Perhaps you have never thought that knives and pencils and scissors are all tools: but they are.

4. Pick out five kinds of tools and three kinds of machinery. Let each one of eight children choose one of these and tell the class how it is used.

Then Read This

This is really a book about Man's slaves. You have already learned many of the ways in which Man

has made plants and animals serve him. You have learned a little about what Man eats and what he wears and what he lives in. You have learned how he keeps warm. But you have also learned that Man could not have the food and shelter and clothing that he has unless he had tools and machinery to make them with.

In Chapter 3 you read that wheat is planted and cut and threshed by machinery. On page 27, you read that grain is ground into flour by machinery. On other pages you have read about *separators* and *refineries* and *pumps* and *pipes* and *looms* and *drills* and *dynamos*. Most tools and machinery are made out of hard *metals* that miners dig out of the ground.

The farmer could not get along without the miner, for he would not even have a hoe or a shovel unless the miner dug iron out of the earth. Neither could the miller nor the lumberman nor the man who weaves cloth. Show why each of these men must have iron tools or machinery.

But the miner must have food to eat, and clothing to wear, and a house to live in. So each of

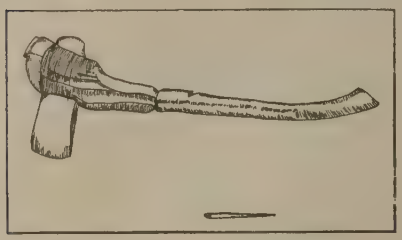
these men needs what the others give him. If one miner stops working, other miners have to do more work. If *all* miners should stop work, after a while our farmers and carpenters would have no more tools to work with, and we should starve.

A *civilized* man needs many things that other men grow or mine or make. Only *savages* can get along without things that they get from others. Civilized men need tools and machinery. Savages can get along with very simple tools that they can make for themselves. Each savage needs more room than a civilized man, because he has to wander about to find food and clothing that nature has made for him. Civilized men can live much closer together, for they use many valuable things that a savage cannot use at all.

Tools are so important that you can tell how comfortable and civilized and wise men are from the tools they use. When men learn how to make stronger and sharper tools, everything that they make is better than it used to be. At first men had dull tools that broke easily. Then they learned

to use one kind of metal after another, and each metal that they used gave them better tools than they had had before.

Here are pictures of stone tools, or implements, that people used very long ago. These pictures tell you better than words what poor tools these really were. What kind of house do you suppose carpenters (if there had been carpenters at that time) could build with such an axe and no saw? What kind of clothes do you suppose dressmakers (if there had been dressmakers at that time) could make with such a needle and no scissors? This was the *Stone Age.*



After a long time men learned to use a metal — *copper.* They learned to mine copper and to melt it and pound it into the shapes they needed. Copper worked better than stone, for many more kinds of tools, and sharper tools, could be made of it. This was the *Copper Age.* We still mine a great deal of copper in the northern and western parts of our country. We do not use it for tools, for we have harder metals now. Read page 187 again and see if you can guess the most important use of copper.

Then men discovered a new metal, *tin.* They learned that if they melted a little tin in with copper,

they got a stronger metal that made better tools. This new metal was *bronze*, and this was the *Bronze Age*. We do not use much bronze to-day, but *brass* is something like bronze, and you have all seen brass door knobs.

After that, men learned to use *iron*. That was the beginning of the *Iron Age*. Many of our tools and machines are made of iron, but more of them are made of a still harder metal, *steel*, that we make out of iron.

There are iron mines in many parts of the world. The most important ones are in our own country. Here is a map that shows where they are. The

crosses show you the places where most of this iron is made into steel. If you compare this map

with the map on page 174, you will see that our iron and steel are made near places where coal is mined.

The iron in iron mines is not pure, like the coal in coal mines. It is found mixed with gravel and

Photo from Brown Bros.

Pouring off the melted steel

dirt. The mixture that we mine is called *iron ore*. To make iron, we heat the ore in big furnaces called *blast furnaces* until it is so hot that it melts and sinks to the bottom. Then we drain off the white-hot melted iron and throw away the part of the ore that we do not want. To make *steel*, we melt

the iron again and mix it with a little limestone and force air through it while it is melted, so that the softer parts are burned away. This makes it still harder. Now do you see why we make iron and steel in places where it is easy to get coal?

Most of the machinery in factories is made of steel. Here is a picture of a steel machine that

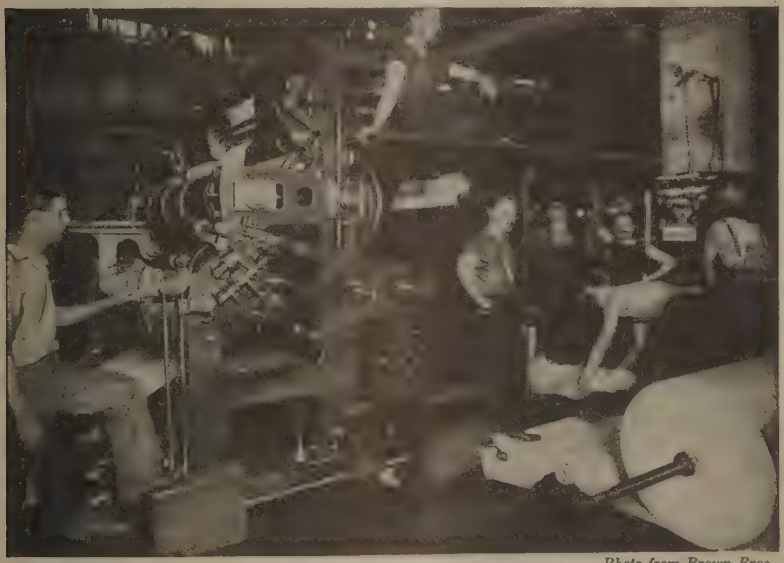


Photo from Brown Bros.

is used to print newspapers. On page 100 is a picture of another steel machine that is used to weave cloth. What do we call machines that weave cloth? Many other kinds of machinery are made of steel, and so are many useful things besides machinery. Look at page 159 again and tell how steel is used in buildings. In Chapter 23 you will read

about railroads. The rails that trains run on are all made of steel. Are you surprised to learn that this is called the *Age of Steel?*

Besides copper and tin and bronze and brass and iron and steel, we use many other metals. We get

Photo from Brown Bros.

Here gold is taken from the ore.

them all by digging them out of the earth, or *mining* them. Most of them come mixed with stone and dirt, and we call them *ores.* What other ore have you just read about? Ore, you remember, must be melted or made pure in some other way before we can get the metal that is in it.

Gold and silver are two of these metals. They are mined in many places in the western part of the United States, and in many other countries. We call them *precious metals* because there is so little of them, and they are so useful, that everybody wants more than he has, and that makes them expensive. For many hundreds of years both of these metals have been used as *money*. What other metals are used for money also? Name other ways in which gold and silver are used.

Now Answer These Questions

1. Why would farmers suffer if miners should stop working? Why would miners suffer if farmers should stop working? Why would *you* suffer if all the people who do any kind of necessary work should stop working?

2. How do the tools that people use show how civilized they are?

3. What are the ages that Man has passed through? Have *all* men passed through all these ages? Remember what you have learned about the Eskimo.

4. What is bronze made of?

5. What is *ore?* What is a *blast furnace?*

6. What things in your schoolroom are made of iron or steel, or have iron or steel parts? Why are they not made of stone? Of copper? Of gold?

23. HOW PEOPLE AND GOODS ARE MOVED.

I. ON LAND

First Do These Things

1. Make a list of all the things you have ever ridden on in your life.

2. If you have an out-door sand pile, make on it mountains of sand and level places and streams. Remember that not all mountains are steep. Remember that streams always flow downhill, in the very bottoms of hollows between mountains. Remember that little streams flow into big streams. Perhaps your teacher will let you make it rain a little with a sprinkling can. If she does, you can find out whether you have put your rivers in the right places. Make a steep *path* over a mountain. Make a *road* over a mountain. Keep it from being too steep by making it go first one way and then the other, or *zigzag*, up the mountain. Then make a railroad. Remember that the railroad must keep almost level, and cannot turn sharp corners.

3. If any of you have taken railroad trips, tell your classmates about them. If any boy or girl has ridden in a *sleeping car* or *dining car*, let him tell about it.

Then Read This

When the first cave men wanted to go from one place to another, they walked or trotted or ran. They had no roads or wagons or automobiles or railroads. When they wanted to bring food or fuel to their cave homes, they carried it. They had not yet learned to make Nature help them do their work.

In many old-fashioned parts of the world, useful things of all kinds, or *goods*, are still carried by men called *porters*. Porters carry heavy loads on their backs, or even on their heads, for many miles. There are many porters in Asia and Africa and in the mountains of South America. Find these continents again on your globe. Porters do not need roads. They can carry goods along steep and narrow *paths* or *trails*, which are just worn places on the ground where other men have walked before. Roads are costly because much work is needed to make them. Paths cost nothing. So porters carry goods in parts of the world where the people have always been too poor to make roads.

We have already learned several ways in which Man has learned to make animals help him. Name some of them. After men had been carrying goods themselves for many hundreds of years, they learned to tame big, strong animals, like the horse and the ox, that could carry much heavier loads than they could

© Publishers Photo Service

Both men and women, in many countries, carry goods for long distances on their heads or backs.

themselves. When men learned to ride horses, they could travel much more swiftly than before, and they could go a longer distance.

For thousands of years travel on horseback was swifter than any other kind of travel. There are men still living who can remember the Pony Express, which carried letters between the central and the western parts of our country only about seventy-five years ago. Fast horses were kept in stables just a few miles apart. Each horse and rider carried mail bags from one stable to the next, so that each mail

From an old print, © Brown Bros.

The Pony Express

bag was carried across the western half of the United States in a very few days.

In parts of the world where it is hard to build roads, goods are still carried on the backs of horses or mules.

One of Man's first and greatest inventions was the *wagon*. On page 14 you were asked to try to guess how rolling logs may have helped men to invent the wagon. If a wagon or a cart or a carriage is hitched to a strong animal and kept on a road that is not too steep, the animal can *pull* a much heavier load than he can carry on his back. And if the load that we want to move is too heavy for one animal, we can hitch more than one animal

to it and make all the animals move it by working together. On page 18 you read of one kind of work that several animals can do but that one animal would not be strong enough to do.

Until the first railroads were built, all the people and goods that were carried on land were carried

Courtesy Criterion Theater, Publicity Department

Pioneers moving west with wagons

or pulled by animals. Our first railroads were not built until about a hundred years ago — when the world was nearly as old as it is now. Even after our railroads were built, horses still had to carry people and freight (freight is another name for *goods*) on country roads and city streets where there were no

railroads. Your fathers and mothers can remember the time when horses did this without any help. Now most of the work of horses has been taken away from them. Can you tell what has done this?

Photo from Brown Bros.

The Twentieth Century Limited, a fast passenger train

In Chapter 21 you read about the steam engine. You learned that the part of the engine that the steam moves can be made to turn wheels. At first men used the steam engine only to turn wheels in factories. Then a man decided to put a steam engine on something like a wagon and make it turn the wheels of the wagon. That, of course, would make the wagon go without being pulled by an animal.

Of course you know that if you put a steam engine on wheels and let it turn the wheels, you have a *locomotive.* The steam engine takes up nearly all the room there is on a locomotive; so we cannot make the locomotive itself carry passengers (we call people who are riding, *passengers*) or freight. But you also know that a locomotive is very strong

and can pull many *cars* if we hitch them to it. The first railroad cars were much like the carriages in which people were used to riding. Later these were made much larger, until *passenger trains* and *freight trains* looked like those shown in the pictures.

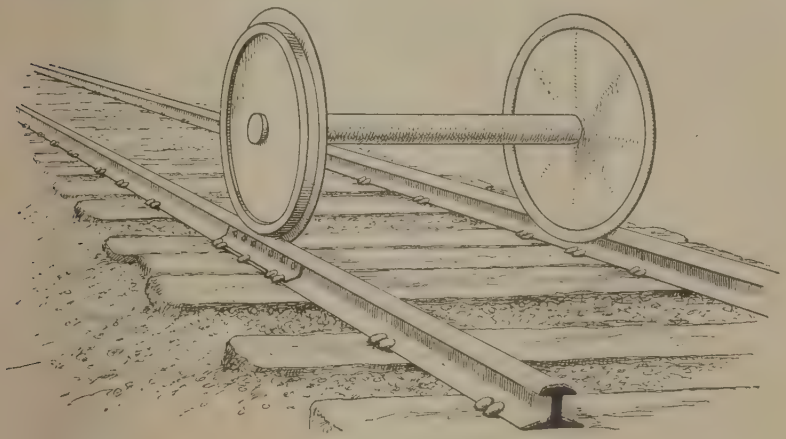
A locomotive is so heavy that if you tried to run it on a road without tracks the wheels would sink down into the road. The locomotive could not go up

Photo from Brown Bros.

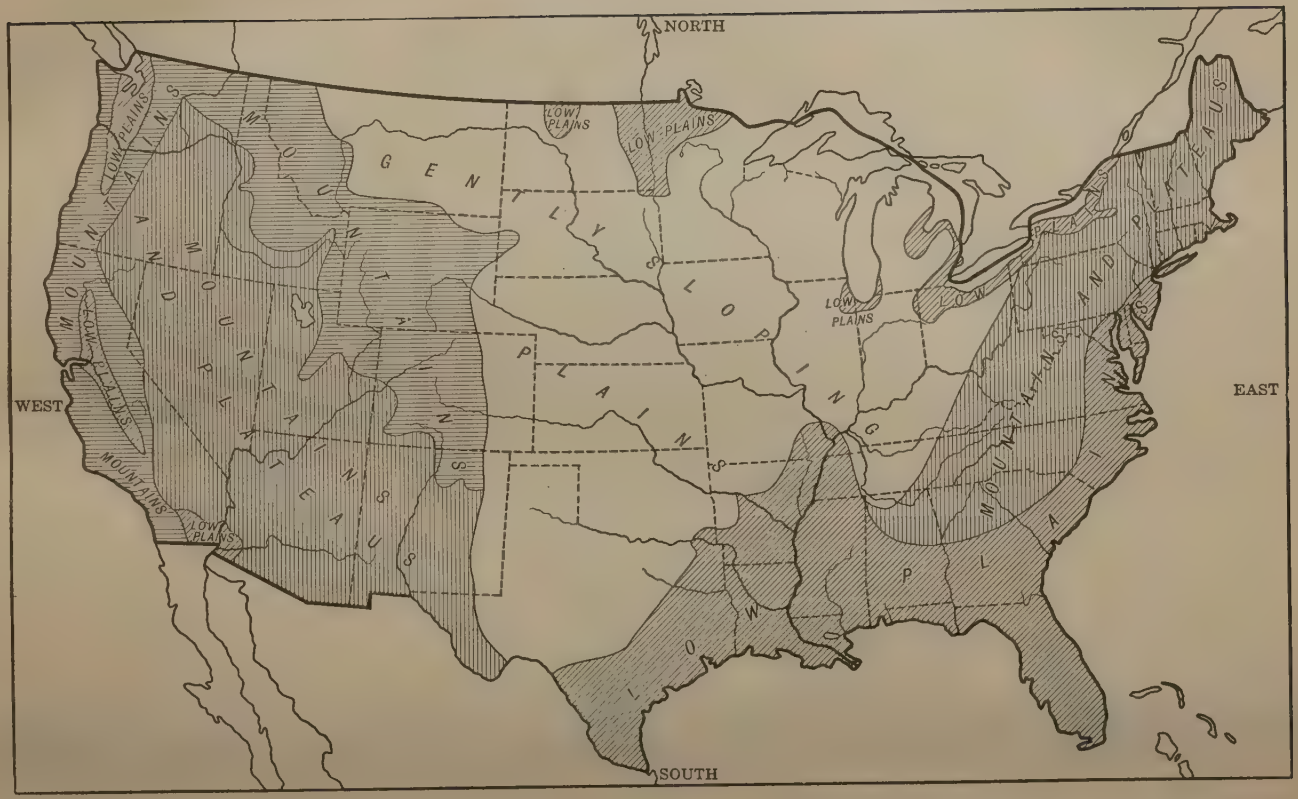
A freight train

the little steep places that are found in most roads. There would be so many bumps that the train would have to go very slowly or be jiggled off the road. A train could not turn square corners. Besides, you could not steer it even if it could. So locomotives and the cars they pull must go on *railroads*. A railroad can climb hills, but it climbs them so slowly that it always *looks* nearly level. It goes right through steep hills in holes called tunnels (page 172). It crosses streams on bridges. And it has no corners, only *curves*. On the railroad

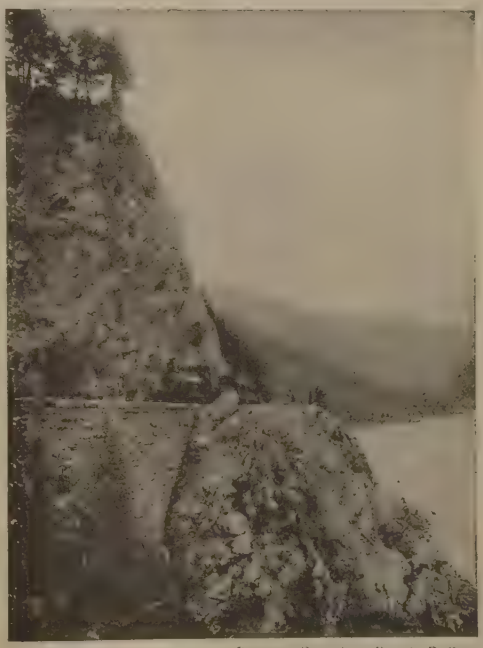
is a *track* — two steel rails spiked to heavy beams called *cross ties*, as shown in the picture. The same picture shows you why the train stays on the track. Explain this picture.



It is easy to build railroads on dry, level land. There is a strip of our country along most of our Atlantic coast and north of the Gulf of Mexico where the land is nearly level and not much higher than the ocean. Land that is level or nearly level is called a *plain*. There is also a large part of the United States where there are wide plains that rise very, very slowly as you go toward the mountains. And there are other plains, called *plateaus*, that are level but that are high up among the mountains. The map on page 206 shows you where these parts of our country are. Here it is easy to build railroads, except across lakes and rivers and marshes.


NORTH
WEST
EAST
SOUTH
LOW PLAINS
LOW PLAINS
LOW PLAINS
LOW PLAINS
LOW PLAINS
LOW PLAINS
MOUNTAINS
MOUNTAINS
GENTLY SLOPING PLAINS
GENTLY SLOPING PLAINS
MOUNTAINS AND HILLS
MOUNTAINS AND HILLS
PLATEAUS
PLATEAUS
LOW PLAINS

(A *marsh* is a place where the water cannot run off when it rains and the ground stays wet and soft most of the time.) In some places men have built a railroad by the side of a stream that flows downhill in the bottom of a *valley*, or hollow between mountains. Here is a picture of such a valley, with a stream and a railroad running along the bottom. There are many such valleys in the parts of our country where there are mountains. Think of the railroad nearest your home, and tell why you think it was built where it is.



Courtesy Canadian Pacific Railway

Now Answer These Questions

1. What is meant by *goods?* By *freight?* By a *passenger?*

2. What is a *porter?* In what kinds of places do men carry freight? Perhaps you have seen men carrying heavy loads. Why did they do it?

3. In what kinds of places do animals carry freight?

4. What is a *locomotive?* What are *cross ties?*

5. Why must a locomotive pull cars on a *track?*

6. What is a *plain?* A *plateau?* A *valley?* In what kinds of country is it easiest to build railroads? Is it easy to build railroads where you live?

24. HOW PEOPLE AND GOODS ARE MOVED. II. ON LAND AND THROUGH THE AIR

First Do These Things

1. Tell how a street car is different from a railroad passenger car.

2. Make a list of all the materials you can that are used in making an automobile.

3. Name all the things you can that are made of rubber.

4. If you live in the country, tell how roads are made. If you live in a city, find how your streets are paved.

5. Learn how to make a kite and how to fly it.

Then Read This

There are more railroads in the United States than in any other country in the world. The railroad tracks in this country are long enough to reach to the moon and halfway back again. It would take the fastest train in the world a year to go the whole length of a railroad as long as all our railroads put together. Only a few places in the United States are so far from a railroad that a man could not walk to the nearest railroad in a day.

You might think that all these railroads would be enough to carry everything we want from the place where it is grown or mined or made to the place where it is used. But goods must be carried *to* the railroad and *from* the railroad, and both people and goods must be carried back and forth in many places where railroads cannot go at all.

One place where a railroad cannot carry people and goods is a city street. When your grandfather was a young man, horses still carried all passengers and freight on city streets. In the large cities, people rode on *horse cars* that looked a good deal like the trolley cars of to-day but were smaller. These horse cars, of course, went very slowly, and as cities grew bigger and bigger it became harder and harder for people to go from their homes to the places where they worked and back again.

Men knew that electricity could turn wheels, as you learned on page 186. So at last someone thought of making an electric motor make a car go, just as another man had made a steam engine make a car go many years before. But an electric motor is much smaller than a steam engine, and we can put it *under* a car instead of letting it use up all the room on top of a car; so electric cars were made to run themselves, without locomotives. Tracks were built on city streets and between near-by cities. Electricity was led to the motors in some cars by wires that

a pole, or *trolley*, on top of the car kept touching; electricity reached the motors of other cars through an *electric rail*, or "third rail," that touched a rod sticking out from the side of each car. Electric cars

Photo from Brown Bros.

A trolley car

Show how the electricity is led to this car.

worked so well that some of our railroads have even begun to use electric locomotives instead of steam locomotives.

But there are two very important things that electric cars cannot do. Most electric cars cannot run except on tracks, and most streets do not have tracks on them. And electric cars cannot be used to take much freight from one place in a city to another. See if you can guess why. How many times

would men have to pick up a trunk if they brought it from the station to your house on a street car?

What people needed on city streets was a wagon or carriage that could go anywhere without horses, and that could travel faster than a horse and carry a

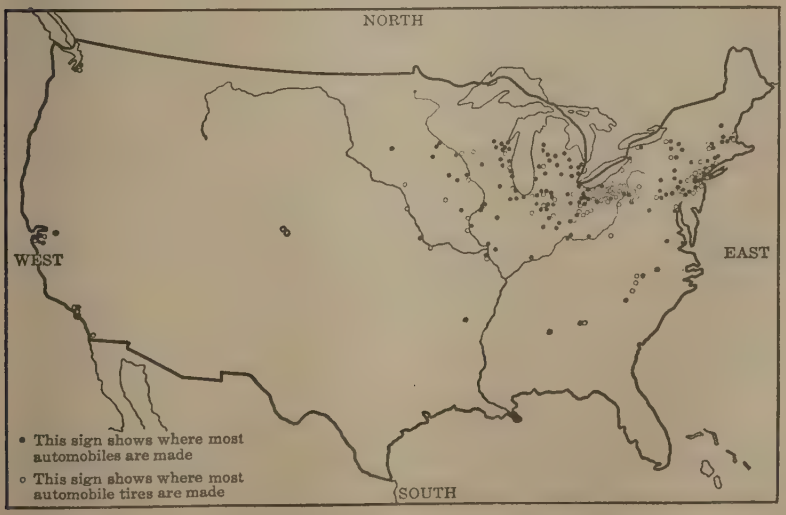
Wherever there are large crowds of people, you can see many automobiles.

heavier load. They needed the same thing on country roads. And what people really need someone almost always invents.

All the automobiles in the world have been made in the few years since your fathers and mothers were children. There are now so many automobiles in our country that if you should count them — "One,

two, three" as the clock ticks — it would take you a whole year, counting ten hours every day. Most of these automobiles have been made in the United States. More than half of them have been made since you were born.

On page 209 you were asked to think of the materials that an automobile is made of. Except for the gasoline engine and the tires, an automobile and an auto truck are made of much the same things that a carriage and a wagon are made of. A few years before you were born, there were many carriage and wagon factories in the northern and eastern part of the United States. When automobiles became common, these factories stopped making carriages and wagons and started making automobiles and trucks.



The map on page 213 shows you where most of our automobiles and tires are made. More automobiles are made in Detroit than anywhere else in the world. More automobile tires are made in Akron than anywhere else in the world.

Wagons jolt along slowly on wheels with iron tires. An automobile or a truck goes so much faster that it would rattle to pieces unless it had rubber wheels. Rubber does something that nothing else in the world can do so well — it comes back into shape after we have pressed it or squeezed it or stretched it out of shape. There are little uneven places in even the best road that keep squeezing rubber tires out of shape. But rubber tires with air inside them quickly go back into shape without jiggling the rest of the wheel. For this reason, rubber tires are the best in the world. So many automobiles are made every year that we need a great deal more rubber than we used to.

Rubber comes from the gummy sap of trees that grow in countries where it is warm the year round. Point out on your globe the belt of warm countries. Rubber will grow almost anywhere in this belt; but most of it comes from the East Indies, which you have already read about on page 85. The sap of the rubber trees is boiled right on the rubber *plantations* (pages 75 and 82) into big round lumps of *crude rubber*. In the rubber factories of our own

Lumps of crude rubber

These have just been brought from the rubber trees in the forest and are ready to be sent on river boats to the ocean. Then ocean steamers will bring them to our country.

country this crude rubber is mixed with sulphur and made into automobile tires and overshoes and raincoats and all the other things that you put in the list you were told to make on page 209.

It is so easy to go long distances in an automobile that people travel a great deal more than they once did. In the country, people who used to live a day's journey apart are now near neighbors. Country children who would have walked a little way to a small school a few years ago now ride a long way to a big school. A great deal of freight that was once sent in railroad cars is now hauled

by auto trucks. Automobiles and trucks cannot go on bad, muddy roads much faster than horses, and sometimes not so fast. So the people of the United States are making many thousands of miles of good, hard roads, or *highways*.

You have learned that gasoline engines make automobiles go. They also make flying machines go. Men have wanted to fly ever since they first saw birds doing something that they could not do themselves.

People have used *balloons*, which float in the air just as a stick of wood floats on water, for many

Courtesy United States Navy

A *dirigible*, or balloon with engines

See if you can find the places where the men ride.

years. A few years before you were born men first made gasoline engines turn big fans on a balloon very fast, so as to make the balloon go where they wanted it to go.

Your fathers and mothers were nearly grown up when men first flew in *airplanes*. An airplane has big wings like a bird's, but no bag like that of a balloon. An airplane cannot rise off the earth at all unless its engine and its fan-like *propeller*

Courtesy Aeronautical Chamber of Commerce of America

A large airplane

This flies between the Peninsula of Florida (page 140) and islands east of it in the Atlantic Ocean.

make it go very fast; if the engine stops, the airplane falls to the ground. Airplanes are very useful in wars. Many of our soldiers flew in them in the big war that our country fought in Europe when you were babies. Since that war, airplanes have been used to carry mail that had to go very fast; for airplanes go much faster than railroad trains

or anything else that men have ever ridden in. Perhaps some day you will ride in one yourself.

Now Answer These Questions

1. Why is it not safe to walk near an electric rail or a trolley wire that has fallen down?
2. Where is the motor in a street car?
3. In what part of the United States are most of our automobiles made? Are automobiles made near the places where steel is made? Answer this question by looking at the maps on pages 193 and 213.
4. What is a *highway?* Why are our roads being made better?
5. What is a *balloon?* An *airplane?* The *propeller* of an airplane?

25. HOW PEOPLE AND GOODS ARE MOVED.

III. ON THE WATER

First Do These Things

1. In a large tub, try to sink an empty tin or iron pail by pushing it straight down into the water. A *leaky* iron pail would sink, for iron is heavier than water and sinks in it. Does this help to show you how big ships can float even when they are made of heavy steel?

2. Get your teacher to tell you or read to you the story of Magellan.

3. Tell why pulling hard on your left oar makes a boat go to the right.

4. Tell why sailboats need rudders, when rowboats do not.

5. In this chapter are pictures of six kinds of boats. Try to name each kind without looking at the titles of any of the pictures.

6. Make a toy schooner, with sails and rudder.

Then Read This

In Chapter 8 you learned that there is a great deal more water than land on the surface of the earth. You can easily see this by looking at your globe, where the continents look like big islands in

one great, round ocean. How do you suppose that men *found out* that the world was round, and that it was mostly covered with water, and that there were other continents far, far away across the ocean from their own? They learned these things by traveling on the ocean in ships.

Your teacher has already told you how Columbus and his men discovered North and South America by crossing the wide Atlantic in little sailing ships. She has told you, too, how Magellan's men sailed all the way around the world for the first time more than four hundred years ago, and how it took them three years to do it. If Man had not had ships, he would have learned very little about this watery world of ours. Without ships, we could not have enough rubber or coffee or bananas or sugar or silk or leather; and without ships we could not sell the things we grow and make to people who live across the ocean. Tell about other things that we could not have or do without ships.

A canoe

Perhaps in your story books you have seen pic-

tures of the ships of olden times. The first boats, of course, were not ships at all, but canoes or rowboats. Thousands of years ago, as you have already learned, men were busy making discoveries that have been very useful ever since. What did the men and women of those early days know about grain? About fire? About houses? About how to use animals? About how to use metals? Men made almost as important a discovery when they learned how to make a boat float and move.

A rowboat

Men had always known that wood would float. By and by they learned that any hollow thing would float. Then they learned that any long, V-shaped hollow thing with pointed ends would slide through the water very easily indeed. They learned that if a man sat in a *canoe* and tried to push a *paddle* back through the water beside him, the blade of the paddle stayed in nearly the same place in the water, and the canoe slid forward instead. Then they found that it was easier to fasten the middle of the paddle to the side of the boat and to pull the handle backward. We call a paddle used in this way, an *oar*. The oarsmen sat facing the *stern*, or rear, of the boat; pulling the handle of an oar

toward the *bow*, or front, of the boat pushed the blade backward, and that made the boat go forward. Pulling oars in this way is called *rowing*.

Rowboats are used even to-day. Fishermen use them, and call them *dories*. When a big ship is sinking in mid-ocean, the people on it save themselves by rowing to safety in *lifeboats*. Rowboats nowadays are always small, for we have learned to make larger boats go in easier ways. But in olden times men often rowed the largest ships they had. Such ships sometimes had several *decks*, like stories in an apartment house (page 136), and the oarsmen sat in rows on each deck.

Courtesy W. F. Roberts

A dory

But rowing is hard work, and men, as you have read more than once, will think very hard to save themselves work. People who traveled on the water in rowboats found that the wind often blew so hard that it pushed their boats over the water. They fastened beams to a strong upright pole called a *mast*. From these beams they hung cloth sails, and so made the part of the boat that the wind struck as wide and

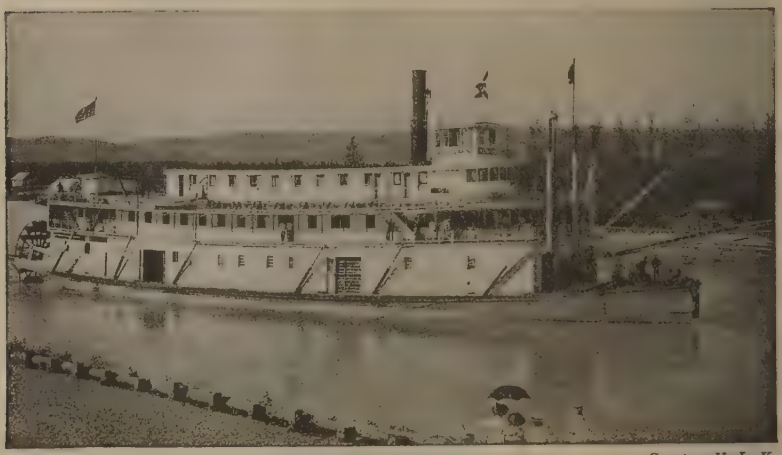
tall as they could. In this way even a gentle wind could be made to move a heavy ship. Such a ship was called a *sailing vessel.* The *sailors* steered it by a *rudder* fastened to the stern. A rudder works like an oar, and helps sailors to make even the largest ship go where they wish.

For thousands of years sailing vessels carried people and goods across the ocean and along the coast from one city to another. Columbus and Magellan and the Pilgrims all traveled on sailing vessels. In sailing vessels, men sailed along the coasts of all the continents and learned their shapes and sizes. Sailing vessels of a kind called *schooners* are still used by some fishermen; and schooners still carry some kinds of freight, like lumber, along our Atlantic and Pacific coasts. But sailing vessels are slow. Sometimes the wind blows too hard, and sometimes not hard enough; and sometimes it blows from the wrong direction. So most freight and passengers are now carried by a faster and surer kind of boat, the *steamship.*

Photo from Brown Bros.

A side-wheeler

In Chapter 21 you learned how coal is used to run a steam engine, and how steam engines are made to turn the wheels of factories. In Chapter 23 you learned how men put steam engines on wheels and made locomotives, to haul trains of cars on land. At about the same time, a famous American



Courtesy H. L. K.

A river steamer

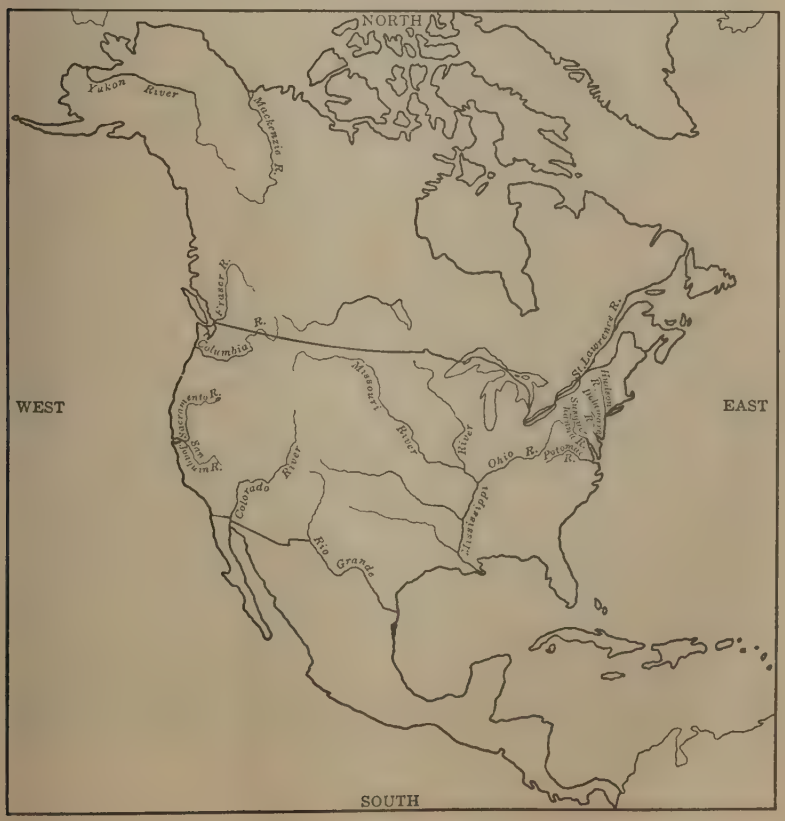
Read the name of the steamer, and find a river by that name on the map on page 225. This picture was taken on a branch of that river.

first put a steam engine in a boat and made it move the boat. Most of our boats nowadays are steamboats.

The first steamboats had paddle wheels on each side. These looked much like the water wheel that used to turn the miller's machinery; but the steamboat's machinery turns the paddle wheel instead, and each spoke, or blade, pushes back against the water

like an oar. Many *ferry boats*, which carry passengers and automobiles and even railroad cars across rivers and narrow arms of the ocean, are *side-wheelers* like the very first steamboats.

Most steamboats that travel on rivers have one wide paddle wheel at the stern instead of one narrow one on each side. River steamboats carry heavy loads more cheaply than railroads can carry them,



A sailing vessel

so they are still used on many rivers in our country. Two such rivers are the Mississippi and the Ohio, which flows into it. Another is the Hudson. On page 225 is a map of North America which shows these rivers. Find the United States on this map. In

© *Wide World*

The largest steamship in the world.

lands where few people live and there are few railroads or highways, river steamboats are very useful. Two rivers in such countries are the Yukon and the Mackenzie. Find these also on this map.

Steamships that travel on the ocean and on large lakes where the water is deep have propellers (page

217) instead of paddle wheels. Some boats have one, some have two, and others have three or even four; but they are always at the stern. The machinery in the ship makes the propeller turn around in the water, and that drives the ship ahead. In most ocean steamships, coal is burned to make the steam engines go; but some of the largest ships use petroleum instead. Steamships travel about half as fast as trains. On page 227 is a picture of one of the largest steamships in the world. It can carry four thousand people and a great many carloads of freight across the Atlantic Ocean in a little more than five days. Has not Man learned a great deal about boats since the time of the first canoe?

Now Answer These Questions

1. What kind of boats did men always use for long voyages until about a hundred years ago?

2. What is a *paddle?* An *oar?* A *paddle wheel?* A ship's *propeller?*

3. What is meant by the *bow* of a ship? By the *stern?* By a *deck?*

4. What are rowboats still used for? What are *side-wheelers?*

5. Why are steamships better than sailing vessels?

6. Here is a hard question: The fastest trains go twice as fast as the fastest ships. The fastest trains cross the United States in about four days.

The fastest ships, as you have just learned, cross the Atlantic Ocean in a little more than five days. Which is wider, the Atlantic Ocean or the United States? When you have answered this question, look at your globe to see if you are right.

26. HOW GOODS ARE BOUGHT AND SOLD

First Do These Things

1. Let the boys in the class play the game of grocery store. Let one boy act as storekeeper and let the others buy different things that they want. Use real or play money, and "make change." Your teacher will help you.

Let the girls play the game of dry-goods store instead.

Or, if you prefer, let the whole class play toy store.

2. Make a list of all the things you can remember that are sold in a drug store; in a hardware store; in a bookstore.

3. Find out all you can about what banks do.

Then Read This

On page 41 you read that stock farmers sell their cattle for money and use the money to buy tools and other things that they need. On page 167 you learned that the rug-makers of Asia do the same thing with their rugs. In civilized countries, each grown person does much more than his share of one kind of work. For this work, each person must be paid enough money to buy everything that he needs.

The farmer grows a great deal more grain or vegetables than he can use, and sells it for money. Then with this money he buys shoes and farm machinery and everything else he needs. The worker in a city factory gets money for *his* work, too, and spends the money for food that the farmer grows and for things that other city workers make.

But why do we need money at all? Why can't the farmer sell a little grain to the owner of a shoe factory for a pair of shoes, and a lot of grain to a maker of automobiles for an automobile, and give the conductor a handful of grain for a ride on a street car? Why can't the doctor visit a sick farmer for a basket of vegetables, and save the life of a sick automobile maker for an automobile? You have

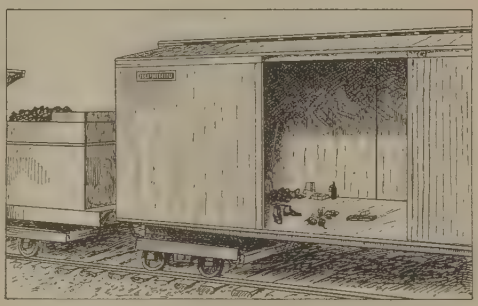
guessed the answer already! The street car conductor couldn't very well collect grain from the farmer and shoes from the owner of the shoe factory. The hungry doctor might not be able to find a sick farmer or grocer, and the ragged doctor might not be able to find a sick tailor. So people have invented *money*.

Money can be carried around easily and counted easily. Money stands for things we want to buy. When your father gives you a quarter, you know that he has really given you pencils or tablets or soda water or candy or street car rides or anything else that a quarter will buy. When a man gets a hundred dollars for a piece of work that he has done, and buys food and clothing and pays his rent, he has really been selling his work to the farmer and the grocer and the tailor and the landlord. In civilized countries everybody sells things for money.

Some people sell things that they grow. Other people sell things that they make. Still other people sell the work that they do. We sell many different things, but we all get the same thing, money. Some people use the money that they get to buy the things they really want and need. Other people use it to buy things that they do not need and that do them harm. Which people are wiser?

Money is a great help in buying things, but even money is not enough. We need *stores*. The farmer

cannot go to a shoe factory every time he wants a pair of shoes. A city factory worker cannot go to a truck farm every time he wants to buy beets or beans. You cannot go to a paper mill every time you want a tablet. You have already learned that these things are carried to the places where they are needed by railroads or ships or auto trucks. But a railroad cannot bother to send a big car to a factory many miles away to get one pair of shoes for the farmer or one bunch of beets for the factory worker or one tablet for you. A great many things of the same kind must be sent at one time. So *storekeepers* buy lots of pairs of shoes or bunches of beets or tablets and sell them one by one to the people who want them.



The storekeeper is so busy buying things from the people who grow them or make them, and then selling them to you or to me, that he hasn't time to make any things himself to sell. Yet he needs money, just as you and I do. So he charges us more for things than he paid for them. The difference between what he pays and what we pay him pays the rent of his store and pays his clerks, if he

has any, and gives him a *profit.* He uses his profit to buy things for himself and his family.

There are many, many different kinds of stores. Far out in the country, there are little *general*

Photo from Brown Bros.

A general store in the country

Notice that many different kinds of goods are sold here.

stores that sell farmers and their families many different kinds of things — gasoline for their automobiles, canned food, brooms, ink, candy, hardware, and dry goods. But the general stores in the country do not sell so many things as they used to a few years ago; for most farmers now have automobiles and can buy things more easily at the larger

stores in towns and cities, even if they have to go many miles to do so.

In cities there are great numbers of *retail stores* where people buy things as they need them. Some stores sell only hardware. Others sell only groceries; others, only men's and boys' clothing; and so on. One very interesting kind of retail store is a *drug store*, which sells not only drugs or medicines, but many other things that are not at all like drugs but that people have learned to look for at a drug store, such as combs and fountain pens and soap and soda water.

In cities there are also big general stores called *department stores*, where you can buy almost anything you want. In most department stores, dry goods are sold on the first floor, or story. Elevators take you to other floors, where you can buy furniture or hardware or almost anything else that you could buy at a retail store. A department store is really a collection of many retail stores, or *departments*. Some of the departments are very large. The other day I bought my baby some toys in the toy department of such a store. There were so many toy animals and games and blocks and dolls that it looked like Santa Claus' own workshop.

Some department stores do not sell goods to people who come to shop. They do not have glass counters where people can see what they are going to

The toy department in a department store

What kinds of toys can you pick out in the picture?

buy, for the customers never come into such stores at all. Instead, these stores send people big picture-books, or *catalogs*, which tell about the things that they have to sell and how much each costs. Then people write letters to these *mail-order* stores, as they are called, and tell what they want. They send the money with the order, and the store sends the goods to each customer by *parcel post* or *express* or *freight*. Get your teacher to tell you the difference between these ways of sending goods.

Retail stores and department stores buy some things from the factories where they are made. They

Photo from Brown Bros.

In the wholesale district of New York City

The building that you see dimly in the center is the same building that you saw on page 159.

buy other things from *wholesale stores*. Wholesale stores will not sell things one by one to you or to me. They sell many things at a time to the keepers of retail stores. I used to pass a wholesale lamp store every morning. That store bought lamps from factories and sold them by the dozen to smaller stores. In big cities like New York or Chicago or Boston there are whole *districts*, or parts of the city, that have only wholesale stores. You do not shop there unless you are buying goods for a store of your own.

In Chapter 10 and Chapter 14 you read about things that we do not grow or make, but that we import from other countries. Many business men called *importers* do this for us. We also sell many things, like meat and steel rails and farm machinery, to the people of other countries. In other words, we *export* these things. The business of buying things from the people who grow or make them and selling them to the people who use them is called *trade*. Both men and countries trade with one another. Our country trades with almost every country in the world.

Wars stop trade. In war times we cannot buy many of the things that we need from other countries, and cannot sell to other countries many of the things that we have made.

Now Answer These Questions

1. How could Robinson Crusoe have used money on his island, even if he had been very rich?
2. Why is money a help to us in trading?
3. Why are stores needed?
4. What are *retail* stores? *Department* stores? *Mail-order* stores? *Wholesale* stores?
5. What is an *importer?* What does *export* mean? What is *trade?*

27. HOW PEOPLE EXCHANGE MESSAGES

First Do These Things

1. Learn how to print with a toy printing press if you can get one.

2. Get a telegraph blank, and learn how telegrams are sent.

3. If you have a radio in your home, tell the teacher what places you "get" or "hear" with it.

Photo from Brown Bros.

A radio

She will show these places on a blackboard map of the United States.

4. Tell the class about a movie that you liked very much. Tell *why* you liked it.

Then Read This

There was a time, very long ago, when Man could talk but could not write. Savages, like the first cave people, use very simple speech. Their words are short and there are not many of them. But even Man's simplest words tell much more than do the calls of animals. When men learned to talk, they could tell one another their thoughts and plan to help one another. And almost everything that men have done, like building houses and churches and ships, they have helped one another to do. Without speech, we should not be much better off than the animals.

You all know how children learn to talk. Baby Sister hears *you* talk, and slowly comes to understand what you mean. By and by she copies your speech. Your father and mother copied the speech of *their* fathers and mothers and their brothers and sisters. People have *always* learned to talk in this way.

In very olden times, groups of people wandered in search of food far from their old homes, and never came back. They no longer spoke just as they used to in their childhood, and their own children's words were just a little different from those which they had

first heard themselves. Then their children grew up and moved, and *their* children's speech was a little more different still. By and by the speech of people in lands far distant from each other became so different that a traveler from one country could not understand the speech of the people in another country. When two persons cannot understand each other's speech, they are said to speak different *languages*. There are now several hundred languages in the world.

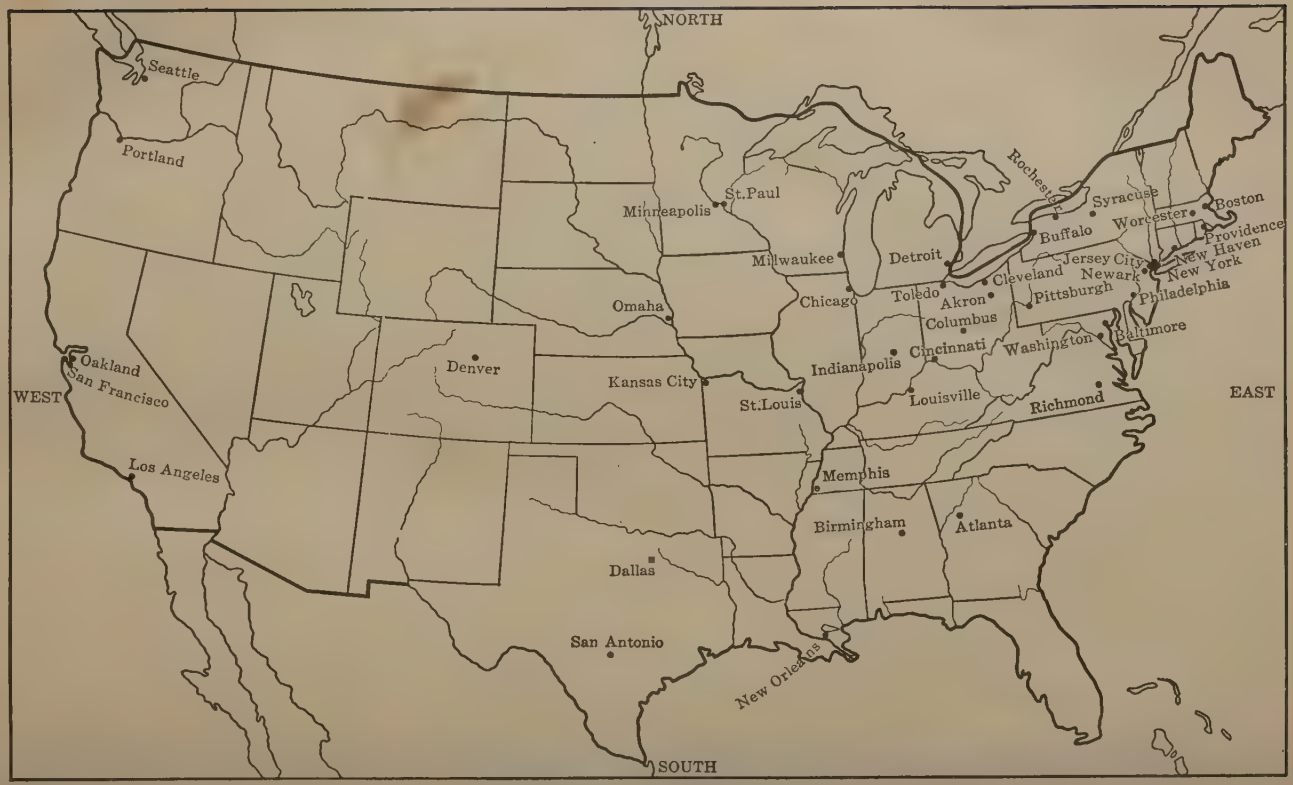
Our own country is very large, yet almost everybody in it speaks the same language. What is the name of that language? Yet even that language is changing slowly all the time, and people speak it a little differently in different places. Hilda Nielson, whom you read about in Chapter 3, understands what a little English girl in her school means when she speaks; but everybody knows that the English girl comes from England, without being told. And if Hilda should visit England, the little girls that she talked to there would know without being told that she came from America.

In South America and in the countries of North America south of us, most of the people speak a language called *Spanish*. On these two continents, then, you can travel many thousands of miles and get along very well if you know only two languages. In Europe it is different. Europe is not much larger

than the United States, yet almost every one of its many countries has its own language. For this reason, people in Europe who travel a great deal often know several languages.

After Man had been talking for thousands of years, he learned to *write*. Then the first books were made, and for the first time men could write down their thoughts for others to read in distant lands, perhaps long afterward. Before writing and books were invented, Man did not become wiser very fast; for old people had to teach young people what they remembered, and what people forgot was lost forever. After books were invented, wise men wrote down what they knew, and none of it was forgotten. Books help us to keep a true story of what has happened and of everything that we learn.

For more than two thousand years books were copied by hand just as you copy your writing lesson with pen and ink. Only one book could be made at a time, and so of course there were not many books to be had. For that reason, only a few people could read. Then *printing* was invented. Raised letters, called *type*, were fastened together in such a way that they spelled words and sentences. Every time the same pieces of type were pressed upon a sheet of paper, a new copy was made. We have learned more and more about how to make books; and books are now so common that almost everybody has books of



The largest cities in the United States

his own. So you can easily see why reading is one of the most necessary things that we learn in school.

Books are made in almost every large city. Very many schoolbooks are made in New York and Chicago and Boston and Richmond and Indianapolis. Here is a map that shows you where these cities are. Perhaps you would like to know how this book was made. First it was typewritten. Then a girl copied the typewritten sheets slowly on what looked like a much bigger typewriter. This made a lot of holes in a long roll of paper, much like the holes in a music roll for a self-playing piano. Then this roll was run through another wonderful machine that made solid letters out of hot, melted lead; and these letters spelled the very words that the girl had copied off the typewritten sheet! Then these letters were locked firmly into steel

Photo from Brown Bros.

This is the machine that looks like a typewriter and begins the work of making type.

frames along with the pictures. Next metal plates were made, just like the type and the pictures. Many of these plates were then put very carefully on a *printing press*, thirty-two pages at a time. Inky rollers were run over them, and sheets of paper were pressed down on the inky plates — one, two, three, ten, a hundred, a thousand, ten thousand at a time! Then the printed sheets were folded and *bound* between cloth covers.

Newspapers and magazines are made in much the same way, only faster.

A very few old people are still living who can remember the time when newspapers never printed fresh news from distant places. No messages were ever sent in those days except by letters or living messengers. Then a great American learned to send messages by electricity over wires many miles long from one city to another. This wonderful invention was called the *telegraph*, and messages sent by it were called *telegrams*. A few years later big, thick wires, or *cables*, were laid on the bottom of the Atlantic Ocean, all the way across; and it took only a few minutes to send messages from the Old World to the New!

Many years later, when your fathers and mothers were children, a great man from Italy (Italy is in

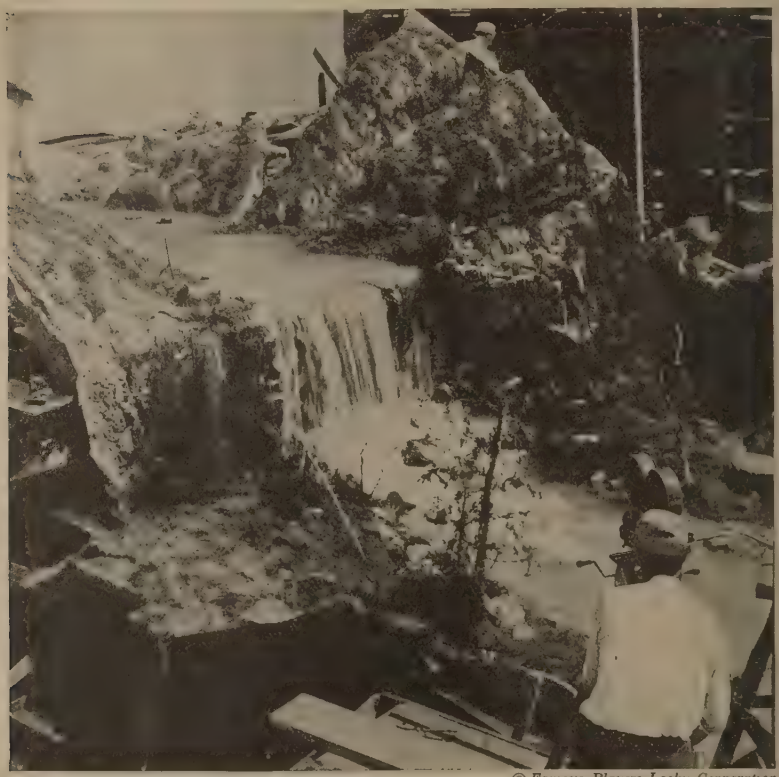
Europe; find it on your globe) learned to send telegrams without wires. People on ships at sea could then send messages to their friends on shore, and sinking ships could call for help.

When your grandfather was a small boy, another American invented the *telephone*, and for the first time people heard one another's voices over many miles of wire. Soon after you were born, a man on our Atlantic coast, for the first time, talked to a man on our Pacific coast over a wire that stretched clear across North America. And you yourself can remember the time when you first heard of the *radio*. Now, with the radio, you can hear a band play hundreds of miles away!

Another very wonderful kind of message is a *photograph*. The photograph tells people far away, and perhaps many years afterward, exactly what you have seen. Until about a hundred years ago, all pictures were drawn or painted slowly by hand. Nowadays newspapers print exact pictures of things that have happened only a few hours before.

There is one kind of photograph that you like to see, I am sure; and that is the *motion picture*. Motion pictures were not invented until after your fathers and mothers were born, and the pictures were very poor and jumpy until only a year or

two before you were born. But picture plays and "news films" are interesting, and almost everybody



© Famous Players-Lasky Corporation

Making a movie

These men are taking pictures which will show little toy boats falling over a play Niagara Falls; but the pictures will look like real boats falling over real falls.

is willing to pay to see them. So there are now many thousands of picture theaters in our country. Motion pictures are shown also in some schools and churches. Many hundreds of actors and actresses and cameramen are needed to make

these pictures for us. Each picture can be printed many times, like a book, and shown in many theaters at the same time. More movies are made near Los Angeles than anywhere else in the world. Find Los Angeles on the map on page 244.

Now Answer These Questions

1. What are meant by *languages?*
2. What two languages are spoken in most of North and South America?
3. Why has the invention of printing made it easy for people to have books?
4. Why are books useful?
5. What is a *printing press?*
6. What is the difference between a telephone and a radio?
7. There is another wonderful invention that helps people to exchange messages. You have not read about it in this chapter; but its name is exactly like *photograph* except for one letter, which is different. What is this invention?
8. There are many good books, and newspapers, and movies; but there are silly books and newspapers and movies, too. How can you tell one from the other?

INDEX

NOTE TO TEACHERS: This index is, of course, largely for teachers' use. The children can, in most cases, consult the Table of Contents more profitably than an index. In case, however, children who have mastered the principles of alphabetical arrangement wish to look up geographic terms of such importance that they are italicized in the text, they will find these printed in **bold-faced type** in the Index. *Italicized* words in the Index represent geographic terms and ideas which it will sometimes be helpful to teachers to locate, but which, because of the need for simplicity, are not designated by these names in the text. Diacritical indication of pronunciation would be unintelligible to pupils and unnecessary for teachers, except in the rare instances where it is given.

Adobe (*ȧ*-dō′bĕ), 133, 135, 137.
Africa, 99, 164, 199.
Age of Steel, 196.
Agriculture, see Farming.
Airplane, 217–218.
Akron, 214.
Animals, 6, 8, 11, 12, 22, 36, 39, 87, 95, 96, 112, 150, 170, 180, 199–202.
Apartment, 137.
Apartment house, 136–137.
Apples, 71.
Argentina (är-jĕn-tē′nȧ), 116, 117.
Asia, 92, 129, 164, 166–167, 199, 230.
Atlantic Ocean, 60, 61, 64, 75, 80, 108, 115, 144, 153, 220, 229.
Australia, 115, 117.
Automobile, 44, 88, 139, 182, 209, 212–216, 218.
Auto truck, see Automobile.

Bacon, 43.
Bale (of cotton), 107, 108.
Balloon, 216–218.
Baltimore, 53.
Bananas, 75.
Bakery, 28–30.
Barn, 56.
Beans, 68, 70.
Beef, 39.
Beef cattle, 42.
Beet sugar, 83, 85.
Belgium, 110–111.
Binder, 20.
Binding (book), 246.
Blast furnace, 194.
Boat, 14, chapter 25.
Boiler, 181.
Boll (cotton) (bōl), 105, 111.
Bolt (of cloth), 109.
Bonfire, 170.
Books, 243, 245–246, 249.
Boston, 53, 64, 82, 126, 245.
Bow, 222, 228.
Bran, 29.
Brass, 189.
Brazil, 91.
Bread, 23.
Breakfast foods, 23.
Brick, 130, 149, 155.
Bricklayers, 149, 156.
Bronze, 189, 193, 197.
Bronze Age, 193.
Brown sugar, 82, 85.
Buffalo. 27, 49.

Building materials, 149.
Butter, 50, 58.

Cable, 246.
Cacao (kȧ-kā′ō or kȧ-kä′ō), 93.
Calico, 109, 111.
California, 72.
Canada, 183.
Cane sugar, 83, 85.
Cannery, see Canning.
Canning:
  Corn, 34, 35, 38.
  Fruit, 74.
  Meat, 44.
Canoe, 220–221.
Car (railroad), 204.
Carcass, 43.
Caribbean Sea (kăr′ĭ-bē′ăn), 75, 76, 92, 93.
Caribou, 10, 96.
Catalog (mail order), 237.
Cattle, 40–43, 52–56, 84, 117.
Cave men, 128–129, 137, 168, 199.
Cement, 157
Certified milk, 50.
Chaff, 21.
Cheese, 50, 57.
Chicago, 43, 49, 53, 238, 245.
Chickens, see Poultry.
Chimney, 171.
China (country), 37, 38, 119.
China (pottery), see Pottery.
Chocolate, 93.
Cities, 40–41, 53, 69, 91, 136, 244.
Civilized people, 24, 29, 99, 191, 232.
Clay, 130, 155.
Cleveland, 53.
Cloth, 95, 99–102, 103, 108.
Clothing, 2, chapters 12–15.
Cloud, 89–90.
Coal, 172–174, 182, 195.
Coast, 64, 67.
Cocoa (kō′kō), 93.
Coconut, 9, 76.
Cocoon (kŏ-koon′) 120.
Cod, 64, 66, 67.
Coffee, 86, 91–92.
Cold countries, see Eskimo.
Columbus, 138, 140, 141, 220, 223.
Communication, chapter 27.
Concrete, 149, 157.
Concrete mixer, 157, 158.
Continent, 92, 93, 99, 115, 219.
Cooking by electricity, 187.
Copper, 187, 189, 192, 197.
Copper Age, 192.
Corn, 42, 47–48, 52, 56, chapter 5.
Corn belt, 33, 38, 141.
Cotton, 101, 112, chapter 13.
Country, 92.
Cows, 8, 12, 36, 40–43, 52–56.
Cream, 58, 59.
Creamery, 50.
Crib (corn), 36–38.
Cross tie, 205, 208.
Crude rubber, 214–215.
Cuba, 80.
Curves (railroad), 204.
Cut (of beef), 43.

Dairy cattle, 52–56.
Dairy farm, 53–58, 59.
Dam, 26.
Dates, 76.
Deck, 222, 228.
Department store, 235–237, 239.
Desert, 87–89, 145.
Detroit, 53, 214.
Dining car, 198.
Directions, 7, 9, 13, 46–48, 69.
Dirigible, 216.
Dishes, see Pottery.
Disk harrow, 18.
Division of labor, 123, 191, 232.
Doll house, 128.
Dory, 222.
Drill (grain), 19.
Drilling (in mining), 173.
Drug store, 230, 235.
Dyeing, 109.
Dynamo, 184–186, 188.

Earth (world), 60, 67.
Earth houses, 131.
East, 46, 144.
East Indies, 85, 99, 214.
Electric car, 209–212.
Electric light, 187.
Electric rail, 211, 218.

Electricity, 173, 134–188.
Elevator (grain), 27.
Elevator (lift), 126.
England, 108, 164.
Erupt, 171.
Eskimo, 7, 9–11, 12, 96–97, 98, 130–131, 134, 137, 166, 197.
Europe, 108, 110, 129, 164, 217, 243.
Evergreen trees, 140.
Exploration, 220.
Exporting, 238, 239.
Express, 237.

Factory, 35, 38, 82, 108, 125–126, 167, 213.
Farmhouse, 134, 135.
Farming, 11, 13, 15, 41, 69, 70, 105, 190–191.
Ferry boat, 226.
Fiber, 101, 105, 107, 108, 110, 112.
Field corn, see Corn.
Figs, 76.
Fire, 14, 128, 180, chapter 20.
Fireplace, 170.
Fish, 10, 11, chapter 8.
Fishing, chapter 8.
Flail, 21.
Flax, 101, 110.
Florida, 140, 141, 217.
Flour, 23.
Flue (furnace), 175, 178.
Food, 2, chapters 2–11.
Forest, chapter 17.
Forest fires, 147, 148.
France, 164.
Franklin, 179, 180, 184.
Freight, 202, 207, 211, 215, 223.
Freight train, 2, 5, 204.
Fruit, chapter 9.
Fuel, 171, 178, 182, chapter 20.
Fur, 96–97, 112.
Furniture, chapter 19.
Furrier, 98.

Gang plow, 17.
Garments, 122.
Gas, 175–176.
Gas jet, 175.
Gasoline, 176–177, 182.
Gasoline engine, 182, 216.
Gas stove, 175.
Gelatin, 43.
General store, 234.
Germany, 164.
Gin (cotton), 107, 111.
Gingham, 109, 111.
Glass, 149.
Glaze, 164–165, 168.
Globe, Frontispiece, 60, 61, 80, 85, 91, 92, 98, 99, 108, 111, 164, 219, 247.
Glue, 43.
Goats, 52.
Gold, 197.
Goods, 199, 202, 207.
Grain, 14, chapters 3–5.
Granite, 149, 153–154.
Grapefruit, 73.
Grass, 52, 55.
Greece, 153, 163–164.
Grist mill, 25.
Growing season, 69–76.
Gulf, 146, 148.
Gulf of Mexico, 146.
Gushing (of petroleum), 177.

Ham, 39.
Hardwood forests, 141, 147.
Harnessing waterfalls, 184, 188.
Harrow, see Disk harrow, Smoothing harrow.
Harvest, 15, 20–22.
Hay, 56, 59, 87.
Head cheese, 44.
Hearth, 170.
Heat belts, 9, 16–17, 49, 69, 71, 75, 79, 91, 96–99, 116, 134.
Hens, see Poultry.
Hides, 43, 97, 117.
Highway, 216, 218.
Hogs, 36, 39, 43.
Holy Land, see Palestine.
Home-grown vegetables, 71, 76.
Horse car, 210.
Horses, 200–202.
Houses, chapter 16.

Implements, see Tools.
Importer, 238, 239.
Importing, 76, 78, 80, 95.
Incubator, 45.
India, 92.

Indianapolis, 245.
Ireland, 110–111.
Iron, 193–196.
Iron Age, 193.
Iron ore, 194.
Island, 80, 85, 140, 141.
Italy, 246.

Japan, 37, 38, 92, 119, 164, 166.

Kernel, 15.
Kerosene, 176–177.
Kiln (kĭl), 155, 157, 160.
Knitting, 112.

Lake, 61, 62, 91.
Languages, 242–243, 249.
Lard, 43.
Laundries, 126–127.
Lava, 170, 178.
Leather, 43, 117–118, 120, 123.
Lifeboat, 222.
Limestone, 149, 154.
Linen, 101, 110–111.
Locomotive, 203, 208, 211.
Log cabin, 132, 141.
Loom, 109, 111.
Los Angeles (lōs ăn′gĕl-ĕs), 53, 86, 249.
Lumber, 135, 143, chapter 17.
Lumber yard, 139.

Machinery, 17–22, 26–27, 30, 82, 109, 135, 139, 173, chapter 22.
Mackenzie River, 226.
Magellan, 219, 223.
Mail order store, 237, 239.
Maize, see Corn.
Man (mankind), 149.
Manufacturing, see the various processes and products.
Map, 46–48, 53, 73, 83, 105, 121, 174, 176, 193, 206, 213, 226, 244.
Maple sugar, 77, 82, 84.
Marble, 149, 150, 153, 155.
Marsh, 207.
Mason, 152.
Mediterranean Sea, 164.
Midas, story of, 1, 5.
Milk, chapter 7.
Mill (factory), 103, 109, 115, 123.
Mill (flour), 15, 24–27.
Mill (lumber), see Sawmill.
Mill (paper), see Paper mill.
Millet, 31, 32.
Miner, 172.
Mineral, 84, 85.
Mining, 84–85, 190–191, 196.
Minneapolis, 27, 49.
Mississippi River, 226.
Molasses, 82, 83.
Money, 197, 230, 232, 239.
Moose, 10.
Mortar, 152, 156. 160.
Motion pictures, 241. 247. 249.
Motor (electric), 186, 188, 211, 218.
Mountain, 145, 148, 198, 206.
Mouth (of river), 65, 67.
Movie, see Motion picture.
Mulberry tree, 119, 120.
Mutton, 39.

Natural gas, 175.
Necessities, chapter 1.
Net (fishing), 63, 67.
New England, 153, 160.
Newspapers, 195, 246, 247.
New York, 40, 49, 53, 82, 104, 122, 125, 238, 245.
Niagara Falls, 183–184.
Nomad, 133, 137, 166.
North, 7, 9, 13, 47, 69, 70, 71, 146.
North America, 93, 98, 164, 220, 226–227 242, 247, 249.
North Dakota, 14.

Oar, 219, 221, 228.
Oats, 31, 32.
Ocean, 16, 88, 89, 90, 220, chapter 8.
Office building, 158.
Ohio River, 226.
Oil, see Petroleum.
Old World, 16, 32, 37, 60, 75, 140, 246.
Oranges, 72–74.
Orchard, 71–73.
Ore, 196, 197.
Orient, 167.
Oriental rugs, 167, 168.

Pacific Ocean, 61, 65, 84, 113, 119, 144 145.

Packing house:
Fruit, 73–74, 76.
Meat, 43–44.
Paddle, 221, 228.
Paddle wheel, 225, 228.
Palestine (păl'es-tīn), 24.
Palm, 9, 76.
Paper, 146–147.
Paper mill, 146–147.
Parcel post, 237.
Passenger, 203, 207.
Passenger train, 204.
Pasteurized milk (pās'tēr-īzd), 56, 59.
Path, 198, 199.
Peaches, 71.
Peninsula, 140, 148, 164.
Petroleum, 176–178, 188.
Philadelphia, 53, 82, 167.
Phonograph, 249.
Photograph, 247–249.
Pilgrims, 138, 143, 153, 223.
Pine forests, 141, 144.
Pioneer, 143, 148.
Pittsburgh, 53.
Plain, 205–206.
Planing mill, 143, 148.
Plants, 6, 8, 11, 12, 87, 95, 96, 150.
Plantation, 75, 82, 214.
Plateau, 205, 206, 208.
Plow, 16; see Gang plow.
Polar bear, 10.
Pony Express, 200–201.
Population, 53, 104.
Pork, 39.
Porter, 199, 200, 207.
Potter's wheel, 164, 168.
Pottery, 162–165, 168.
Poultry, 39, 45.
Power, 26, chapter 21.
Power house, 184, 188.
Precious metals, 197.
Primitive peoples, 15, 24, 199, 241.
Printing:
Books, magazines, and newspapers, 243–246, 249.
Cloth, 109.
Propeller, 217, 218, 227, 228.
Printing press, 195, 240, 246, 249.
Public buildings, 153, 154, 156, 160.
Quarrying, 150, 152, 160.

Races, 9, 32, 37.
Radiator, 175, 178.
Radio, 240, 247, 249.
Raffia, 104.
Railroad, 42, 52, 57, 70, 198, 203–207, 209, 210, 233.
Rain, 90, 91.
Rainfall, see Rain.
Raisins, 87.
Raw milk, 56, 59.
Raw silk, 120.
Ready-made clothing, 124, 125.
Reaper, 22.
Reaping, 15, 20–22.
Refinery:
Petroleum, 177.
Sugar, 82, 85.
Refrigerator car, 57.
Regions (of United States), 32, 69, 141–146, 156, 192, 205–206, 213.
Reindeer, 10.
Retail store, 235, 239.
Reviews, 93, 121–122, 127, ends of all chapters.
Rice, 31, 32, 37, 38.
Richmond, 245.
River, 61, 62, 90, 91, 226.
River steamer, 225.
Road, 198, 209; see Highway.
Robinson Crusoe, story of, 189, 229.
Rowboat, 221.
Rowing, 222.
Rubber, 209, 214–215.
Rugs, 166–167, 230.
Ruins, 151–153, 160.

Safety precautions, 139, 169, 176, 182, 185, 218.
Sail, 222.
Sailboat, 219.
Sailing vessel, 223, 226.
Sailor, 223.
St. Louis, 40, 41, 49, 53, 98, 126.
St. Paul, 98.
Salmon, 64–65, 66, 67.
Salt, 77, 84.
Sand pile, 119.

Sandstone, 149, 154.
Sand table, 93.
Sausage, 43.
Savages, 191, 241.
Sawmill, 139, 142–143, 144, 148.
Schooner, 219, 223.
Scouts, Boy and Girl, 129, 169.
Scythe, 16, 22.
Sea (ocean), 61, 67.
Seal, 10, 96.
Seams (of rock or coal), 152, 172.
Separator, 58, 59.
Set (of concrete), 157, 160.
Sewing machine, 121, 123–124.
Shaft, 172, 173, 178.
Shearer, 115, 120.
Sheep, 113–117, 120.
Sheep herder, 113, 120, 133, 166.
Shelter, 3, chapters 16–20.
Ship, 61.
Shoes, 123, 126, 127.
Sickle, 16.
Side-wheeler, 223, 226, 228.
Silk, 96, 101, 112, 118–120.
Silkworm, 118–120.
Silo, 35, 37, 38, 56.
Silver, 197.
Sirup, 77, 82.
Skyscraper, 158–159.
Slabs (of marble), 154.
Slaughtering, 42.
Sleeping car, 198.
Smoothing harrow, 19.
Snow house, 131.
Sorghum (sôr'gŭm), 83, 85.
South, 47, 69, 70, 71, 75, 83, 104, 146.
South America, 92, 99, 115, 199, 220, 242, 249.
Southern pine, 141.
Spain, 80.
Spanish, 242.
Speech, 241.
Spices, 77, 85.
Spinning, 108, 116.
Starch, 35.
Steam, 180–181.
Steam engine, 181, 203, 225.
Steel, 159, 193–196.
Stern, 221, 228.
Stock, 42.
Stockings, 125.
Stone Age, 192.
Stone building, 129, 137, chapter 18.
Store, 158, chapter 26.
Storekeeper, 233.
Stories: Columbus, 138; Franklin, 179; Magellan, 219; Midas, 1, 5; Pilgrims, 138; Robinson Crusoe, 189; Swiss Family Robinson, 162.
Story (of a building), 136, 137.
Straw, 21.
Strawberries, 71.
Street car, see Electric car.
Sugar, chapter 10.
Sugar beets, 81, 83.
Sugar cane, 79–84.
Swiss Family Robinson, story of, 162.

Tailors, 124.
Tannery, 117–118, 120.
Tea, 91–92.
Teaching apparatus, see Globe, Sand pile, Sand table.
Telegram, 246.
Telegraph, 240, 246.
Telephone, 247, 249.
Temperate climate, 99, 102, 116, 130, 133.
Tents, 131, 134.
Thread, 101, 110, 112.
Thresher, 20, 21.
Threshing, 20, 21.
Tile, 159.
Tin, 192.
Tires (automobile), 213–215.
Tools, 3, 16, chapter 22.
Topography, 17, 198, 205–207.
Toy store, 235–236.
Track (railroad), 205.
Tractor, 17, 18.
Trade, 238–239.
Trail, see Path.
Transportation, 4, chapters 23–25.
Trapper, 97.
Trawl, 64, 67.
Trees, 7, 8, 11, 87, chapter 17.
Trolley, 211.
Trolley car, see Electric car.
Tunnel, 172, 178.

Turpentine, 146, 148.
Type, 243, 245–246.

Underwear, 125.
United States, 2, 17, 22, 26, 32, 37, 78, 93, 94, 104, 111, 129, 137, 144, 153, 164, 165, 209, 213, 218, 229, 240.

Valley, 207, 208.
Vase, Greek, 163.
Vegetables, chapter 9.
Vermont, 77, 84.
Volcano, 170, 171, 178.

Wagon, 14, 201.
Warm countries, 9, 47, 69, 71, 75, 79, 91, 98, 116, 134.
Water, chapter 11.
Waterfall, 183–184, 188.
Water power, 183.
Water wheel, 26, 29.
Weaving, 100–101, 103.
Well:
  Petroleum, 177.
  Water, 88, 90, 91.
West, 46, 113, 138, 141, 144, 146.
Wheat, 47–48, chapters 3–4.
Whipsaw, 143.
Wholesale district, 237–239.
Wholesale store, 237–239.
Wind, 89, 180, 188.
Windmill, 179.
Wood (as fuel), 171.
Wooden building, 129–130, 137.
Wood lot, 171.
Wool, chapter 14.
Woolen cloth, 100–101.
Writing, 243.

Yarn, 115, 120.
Yukon River, 226.

Zoo, 40.